

Message

From: Roff, Nicholas [Roff.Nicholas@epa.gov]
Sent: 9/8/2021 6:51:10 PM
To: Assunto, Carmen [Assunto.Carmen@epa.gov]
CC: HQ EOC Public Information Officer [HQ_PIO@epa.gov]; Loesel, Matthew [loesel.matthew@epa.gov]; Patel, Anish [patel.anish@epa.gov]
Subject: Please Review - Hurricane Ida ASPECT Map for September 7th
Attachments: ASPECT MAP - Hurricane Ida_20210908_rev1.pdf

Carmen,

Please see attached pdf of the revised map for approval.

Thank you in advance,



Nick Roff
Federal On-Scene Coordinator
U.S. Environmental Protection Agency – Region 6
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Dallas, Texas 75270
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(469) 578-5172 (cell)
roff.nicholas@epa.gov

Message

From: I [subracom@aol.com]
Sent: 9/9/2021 8:00:33 PM
To: Loesel, Matthew [loesel.matthew@epa.gov]
Subject: Re: ASPECT Report for September 8, 2021

Thank you

Wilma

-----Original Message-----

From: Loesel, Matthew <loesel.matthew@epa.gov>
To: SubraCom@aol.com <SubraCom@aol.com>
Sent: Thu, Sep 9, 2021 2:44 pm
Subject: RE: ASPECT Report for September 8, 2021

Thank you. ASPECT did not fly today and is on stand-by for additional missions.

From: I <subracom@aol.com>
Sent: Thursday, September 9, 2021 2:38 PM
To: Loesel, Matthew <loesel.matthew@epa.gov>
Subject: Re: ASPECT Report for September 8, 2021

Aspect Report for September 8, 2021

The report lacks a Figure 4. Figure 5, Valero Refinery, should have been Figure 4 according to the text.

Wilma Subra

-----Original Message-----

From: Loesel, Matthew <loesel.matthew@epa.gov>
To: SubraCom@aol.com <SubraCom@aol.com>
Sent: Thu, Sep 9, 2021 1:46 pm
Subject: ASPECT Report for September 8, 2021

Ms. Subra –

Please find attached a copy of the Draft Report from the ASPECT flight on September 8 in response to Hurricane Ida for review and comments. The report for yesterday should be available later today as well. Thank you for your attention to this.

Matthew Loesel
U.S. EPA – Federal On-Scene Coordinator
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loesel.matthew@epa.gov

Message

From: Taylor, Jillianne [Taylor.Jillianne@epa.gov]
Sent: 9/7/2021 1:52:23 PM
To: Loesel, Matthew [loesel.matthew@epa.gov]
Subject: RE: ASPECT Report for September 5, 2021
Attachments: ASPECT Summary - Hurricane Ida 5 September 2021 Final.docx

Final September 5 report w/ Ms. Subra's correction.

From: Loesel, Matthew <loesel.matthew@epa.gov>
Sent: Monday, September 6, 2021 10:19 PM
To: Taylor, Jillianne <Taylor.Jillianne@epa.gov>
Subject: Fwd: ASPECT Report for September 5, 2021

Sent from my iPhone

Begin forwarded message:

From: I <subracom@aol.com>
Date: September 6, 2021 at 9:32:42 PM CDT
To: "Loesel, Matthew" <loesel.matthew@epa.gov>
Subject: Re: ASPECT Report for September 5, 2021
Reply-To: I <subracom@aol.com>

In the Line Scanner Data Results section it is stated, "A total of 34 data collection runs were made."

In the Conclusions section it is stated "A total of 32 active data collection passes were made covering 26 facilities."

In Appendix A information was provided on a total of 34 runs.

Please make the number of passes/runs consistent.

Wilma Subra

-----Original Message-----
From: Loesel, Matthew <loesel.matthew@epa.gov>
To: SubraCom@aol.com <SubraCom@aol.com>
Sent: Mon, Sep 6, 2021 7:23 pm
Subject: ASPECT Report for September 5, 2021

Ms. Subra –

Please find attached a copy of the Draft Report from the ASPECT flight on September 5 in response to Hurricane Ida for review and comments. The report for yesterday should be available later today as well. Thank you for your attention to this.

Matthew Loesel

U.S. EPA – Federal On-Scene Coordinator

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Airborne Spectral Photometric Environmental Collection Technology

ASPECT Air Quality Survey Hurricane Ida Baton Rouge, LA September 5, 2021



ASPECT Mission Supporting:

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Acronyms and Abbreviations

Alt	Altitude (in feet)
AGL	Above Ground Level
cm	centimeter
CDT	Central Daylight Time
DEM	Digital Elevation Model
ESF-10	Emergency Support Function #10 – Oil and Hazardous Materials Response
FEMA	Federal Emergency Management Agency
FTIR	Fourier Transform Infrared Spectrometer
FTP	File Transfer Protocol
igm	Spectral data format based on grams format
IR	Infrared
IRLS	Infrared Line Scanner
jpg	JPEG image format
kts	knots
mph	miles per hour
m/s	meters per second
MSIC	Digital photography file from the Imperx mapping camera
MSL	Mean Sea Level Altitude (in feet)
PAN	peroxyacetyl nitrate
Ppm	parts per million
RMP	Risk Management Plan
UTC	Universal Time Coordinated

Executive Summary

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 29 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2nd, 2021, the State of Louisiana requested ESF-10 assistance through FEMA and Region 6 asked for the ASPECT plane to be deployed in support of the response to Hurricane Ida. The state wanted assistance monitoring facility emissions in the industrial area between Baton Rouge and New Orleans, where flaring is resulting in the visible emission of black smoke.

ASPECT was tasked to perform remote chemical sensing over target properties to screen for airborne chemicals and take high-resolution photos to provide situational awareness. Potential areas identified for monitoring included: East Baton Rouge, Ascension, Iberville, St. James, St. John, St. Charles, Jefferson, and Orleans. The system conducted one flight mission on 2 September 2021 including air monitoring survey collections over the target area with favorable weather conditions for all passes. Although two black plumes were visible over one of the sites, no major emissions were detected with the FTIR.

A continuation of the overall Baton Rouge facility survey was conducted on September 3. Two data collection flights were conducted which bracketed a Presidential temporary flight restriction not allowing any flight activity. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Flight 5 and 6 were conducted as part of survey operations conducted on September 4. A total of 17 facilities were surveyed. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm in addition to ozone and peroxyacetyl nitrate. Analysis of IR imagery indicated that some facilities are showing hot process units.

ASPECT conducted two data collection missions on September 5 with the focus being facilities in the St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 34 active data collection passes were made covering 26 facilities. Imagery collected within impacted areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

ASPECT Air Quality Survey

Hurricane IDA

Baton Rouge, LA

September 5, 2021

Background and Operational Overview

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 29 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2, 2021, ASPECT was tasked to conduct a wide area air quality screening level assessment of areas populated with Risk Management Plan (RMP) sites and petrochemical facilities using the ASPECT system for detections of any airborne contaminants from ASPECT's 76 chemical detection library in the areas affected by Ida. The Region wanted to know if any detections were found, the location of the detection, and the concentration detected. Sites including Marathon Petroleum Company, Shell Norco Facility, and Phillips 66 pipeline site were surveyed. There were no chemical detections at the sites surveyed. Extremely slow satellite transmission speeds (possibly due to high bandwidth use by other first responders) resulted in long delays in data collection. Some chemical photos were pulled down during flight, with the majority needing to be pulled down with a more high-speed internet connection on the ground.

On September 3 ASPECT was tasked with a continuation of the general Baton Rouge area survey and conducted two flights. 8 locations in the Baton Rouge area were surveyed as part of two flights. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Two data collection flights were conducted on September 4 focusing on facilities south of Baton Rouge. A total of 29 active data collection passes were made covering 17 facilities. Analysis of IR imagery indicated that some facilities are showing hot process units. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm.

The mission focus for September 5 included a general survey of facilities in St. Bernard, Terrebonne, St. Charles, and St. James. In addition, a request was made to investigate potential oil sheens near Port Fourchon. Targeted facilities are given in Table 1.

Table 1. Sites Covered on September 5, 2021, Flights 7 and 8

Facility	Latitude	Longitude
Cornerstone Chemical Company	29.964722	-90.264722
Chalmette Refining LLC	29.937903	-89.969903
Union Carbide Corp - St. Charles Plant	29.982289	-90.455622
Phillips 66 Co - Alliance Refinery	29.68406	-89.98145
BASF Corp - Zachary Site	29.547603	-90.523231
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381
Roehm America LLC - MMA Plant	29.9575	-90.265833
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955
Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339
Denka Performance Elastomer LLC	30.053928	-90.524792
DuPont Specialty Products USA LLC - Pontchartrain Site	30.05388	-90.52472
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722
Mosaic Fertilizer LLC - Uncle Sam Plant	30.037222	-90.8275
Targa Midstream Services LLC	29.237034	-89.384977
EnLink LIG Liquids LLC - Gibson Gas Processing Plant	29.643056	-90.961944
NuStar Logistics LP - St James Terminal	30.030065	-90.843463
Enterprise Gas Processing LLC - Norco Fractionation Plant	30.015411	-90.402958
Discovery Producer Services LLC - Discovery Paradis Fractionation Plant	29.858889	-90.453333
Plains Marketing LP - St James Terminal	30.004341	-90.848449
Dyno Nobel LA Ammonia LLC - Ammonia Production Facility	29.964789	-90.264625
YCI Methanol Plant	29.97481	-90.86775
IGP Methanol LLC - Gulf Coast Methanol Complex	29.625453	-89.926611
KMe St James Holdings LLC - Methanol Terminal	29.990919	-90.841239
Kemira Chemicals Inc	29.964722	-90.264722
Port Fourchon Oil	29.13349	-90.2018

General Mission Objectives

Once granted access to fly over the sites, the following general mission objectives were employed in conducting data collection with ASPECT:

1. To capture an overall, situational awareness of the incident using aerial photography with:
 - Oblique camera—photos taken by hand from the view/position of the co-pilot, and

- MSIC photos—advanced camera mounted underneath the plane for a top-down view of the designated sites.
2. To qualitatively locate and characterize any the visible and non-visible components of a plume, as well as any areas on fire:
 - Using the Infrared Line Scanner (IRLS)
 3. To screen for the presence and location of specific chemicals within ASPECT’s automated chemical detection library:
 - Using the Fourier Transform Infrared (FTIR) Spectrometer

Flight Conditions and Status

Weather and Site Conditions

Prior to each flight, an updated status of the current and forecasted weather, site conditions and any potential flight obstacles including radio towers impacting safety is assessed by the crew. A summary of the ground weather conditions during the missions can be found in Table 2 and 3.

**Table 2. Ground Weather for Baton Rouge, LA, Flight 7
September 5, 2021**

Time	853	953	1053	1153	1253	1353
Wind direction	0 degrees N	270 degrees W	315 degrees NW	0 degrees	270 degrees W	292.5 degrees WNW
Wind speed	0.4 m/s (1.0 mph)	4.0 m/s (9.0 mph)	3.1 m/s (7.0 mph)	1.3 m/s (3.0 mph)	3.6 m/s (8.0 mph)	3.6 m/s (8.0 mph)
Temperature	27.2 C	28.3 C	29.4 C	30.6 C	31.7 C	32.2 C
Relative humidity	91	85	77	72	65	64
Dew point	25.6 C	25.6 C	25.0 C	25.0 C	24.4 C	24.4 C
Pressure	1013.3 mb	1013.6 mb	1013.9 mb	1013.6 mb	1012.6 mb	1011.9 mb
Ceiling	Few 2000 Ft	Scattered 1600 Ft	Broken 1600 Ft	Few 2400 Ft	Few 3400 Ft	Few 4100 Ft

**Table 3. Ground Weather for Baton Rouge, LA, Flight 8
September 5, 2021**

Time	1453	1553	1653	1753	1853	1953
Wind direction	0 degrees	225 degrees SW	202.5 degrees SSW	202.5 degrees SSW	180 degrees S	180 degrees S
Wind speed	2.7 m/s (6.0 mph)	2.7 m/s (6.0 mph)	3.1 m/s (7.0 mph)	3.1 m/s (7.0 mph)	3.1 m/s (7.0 mph)	1.3 m/s (3.0 mph)
Temperature	27.2 C	27.2 C	27.8 C	27.8 C	26.7 C	24.4 C
Relative humidity	47	46	41	46	51	62
Dew point	15.0 C	14.4 C	13.3 C	15.0 C	15.6 C	16.7 C
Pressure	985.8 mb	985.1 mb	984.8 mb	984.8 mb	984.5 mb	984.5 mb
Ceiling	Clear	Clear	Clear	Clear	Clear	Clear

Data Results

The following data is provided as a summary analysis. All data products are available for the Region to access on a shared FTP site. For a complete list of available products, see Appendix A. The data collected during these missions included a flight path summary, IRLS images, FTIR chemical identification and quantification, high resolution MSIC photos, and oblique photos.

Flight Paths

Wide, slow turns are required to be made in between runs to keep the instruments stable. The blue lines indicate the flight path while the green lines indicate the specific sections of the flight where chemical data was collected and processed. On Flight 7 the Houma and Louisiana coastline areas were surveyed, and on Flight 8 the St. Bernard, Terrebonne, St. Charles, and St. James areas were surveyed. The flight paths are shown in Figures 1 and 2.



Figure 1. Data Collection Flight Path,
Houma and Louisiana Coastline, Flight 7,
September 5, 2021



Figure 2. Data Collection Flight Path,
St. Bernard, Terrebonne, St. Charles, and St. James, Flight 8,
5 September 2021

Figure 3 shows a closeup detail of a portion of the mission for Flight 8 showing the flight path of the aircraft, the locations of the aerial photos, the portion of the flight line in which the FTIR was active (green) and the center point of the IRLS image (star).



Figure 3. Detail of the Flight Path Data for Flight 8, September 5, 2021

Line Scanner Data Results

A total of 34 data collection runs were made over the target facilities and an infrared line scanner image was generated for each collection run. Figure 4 shows a 3-band infrared image collected over the Chalmette Refinery. Thermal analysis of the imaged tended to show little with exception of a flare on the bottom of the image. No discharges were observed being emitted from the facility. Figure 5 shows an ASPECT pattern recognition product for oil detection of a light sheen observed near Port Fourchon.

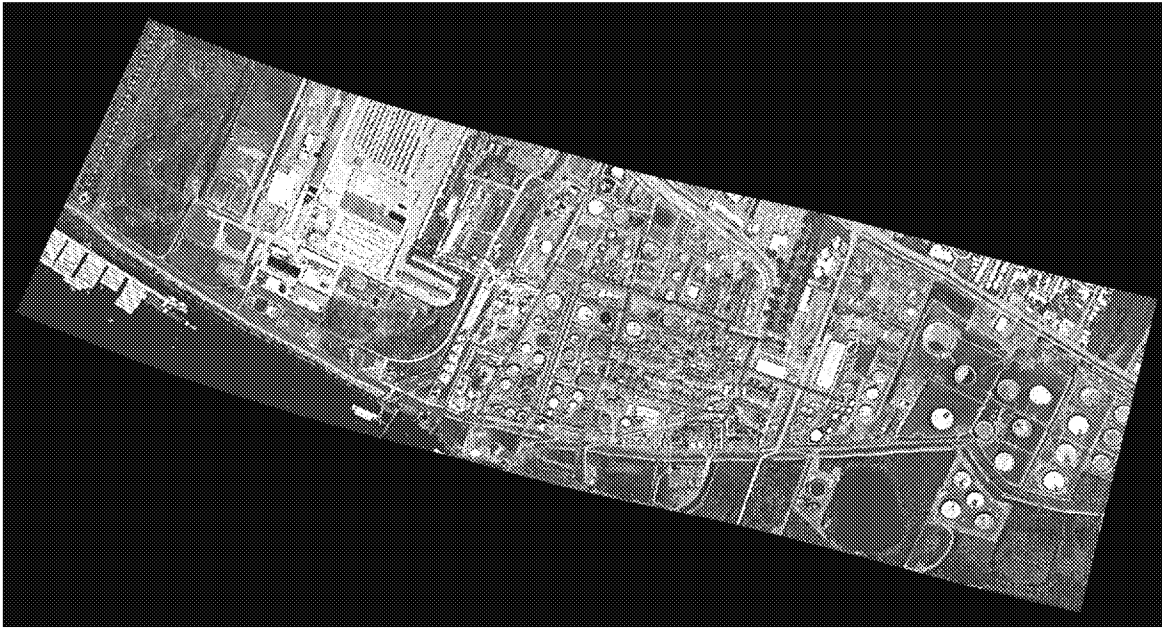


Figure 4. Three band IR image, New Orleans Area, Run 16, Flight 7, September 5, 2021

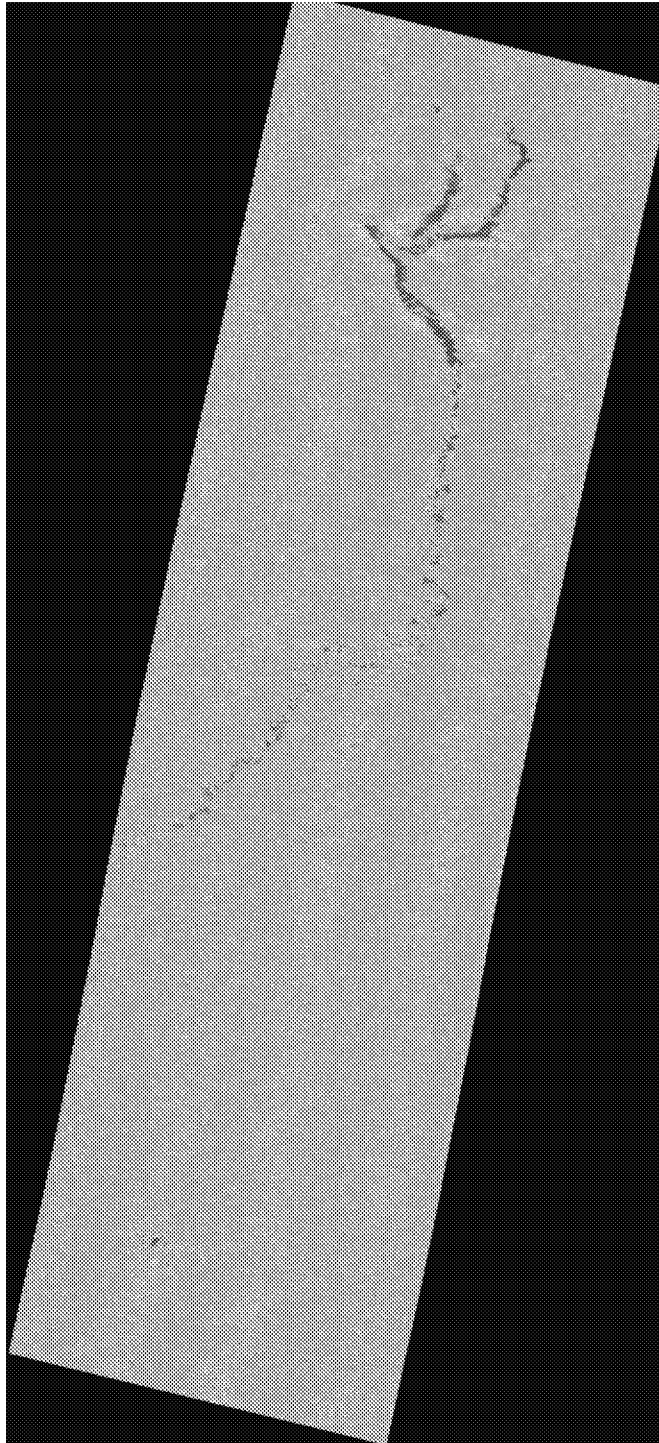


Figure 5. Pattern Recognition Oil Detection Near Port Fourchon Flight 7, September 5, 2021

FTIR Data Results

FTIR spectral data at a resolution of 16 wavenumbers was collected for each run. ASPECT uses an automated detection algorithm to permit compounds to be automatically analyzed while the aircraft is in flight. Seventy-six chemical compounds are included in the airborne algorithm library (the list is provided in Appendix C, Table 1). In addition, collected data was also manually quality checked against a collection of published library spectra for each chemical detected.

ASPECT did not detect any programmed compounds (those found in Appendix C, Table 1) as part of the mission over the target areas on the two flights conducted on September 5, 2021. Details of the monitoring results can be found in Tables 4 and 5.

**Table 4. Chemical Results Summary
Houma and Louisiana Coastline, Flight 7**

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-05	14:26:39	Test	Test
2		15:05:49	ND	ND
3		15:12:54	ND	ND
4		15:28:49	ND	ND
5		15:49:04	ND	ND
6		15:55:08	ND	ND
7		15:59:39	ND	ND
8		16:06:38	ND	ND
9		16:33:52	ND	ND
10		16:45:19	ND	ND
11		17:05:35	ND	ND
12		17:17:48	ND	ND
13		17:24:43	ND	ND
14		17:33:04	ND	ND
15		17:43:57	ND	ND
16		17:59:09	ND	ND
17		18:15:46	ND	ND

Table 5. Chemical Results Summary
St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 8

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-05	20:53:57	Test	Test
2		21:11:45	ND	ND
3		21:23:13	ND	ND
4		21:32:39	ND	ND
5		21:40:05	ND	ND
6		21:46:36	ND	ND
7		22:06:58	ND	ND
8		22:20:22	ND	ND
9		22:26:41	ND	ND
10		22:36:04	ND	ND
11		22:45:09	ND	ND
12		22:55:49	ND	ND
13		23:05:37	ND	ND
14		23:13:32	ND	ND
15		23:20:31	ND	ND
16		23:27:24	ND	ND
17		23:32:23	ND	ND

Aerial Photography Results

A full set of high-resolution aerial digital photography were collected as part of each data collection pass. Weather conditions over the survey had some low ceilings but a set of aerial images were collected at each location. Figures 6 shows a representative aerial image collected near Venice, LA. Standing water is present in the secondary containment. Figure 7 shows an oblique image of a damaged oil facility showing what appears to be product within the facility containment structure.

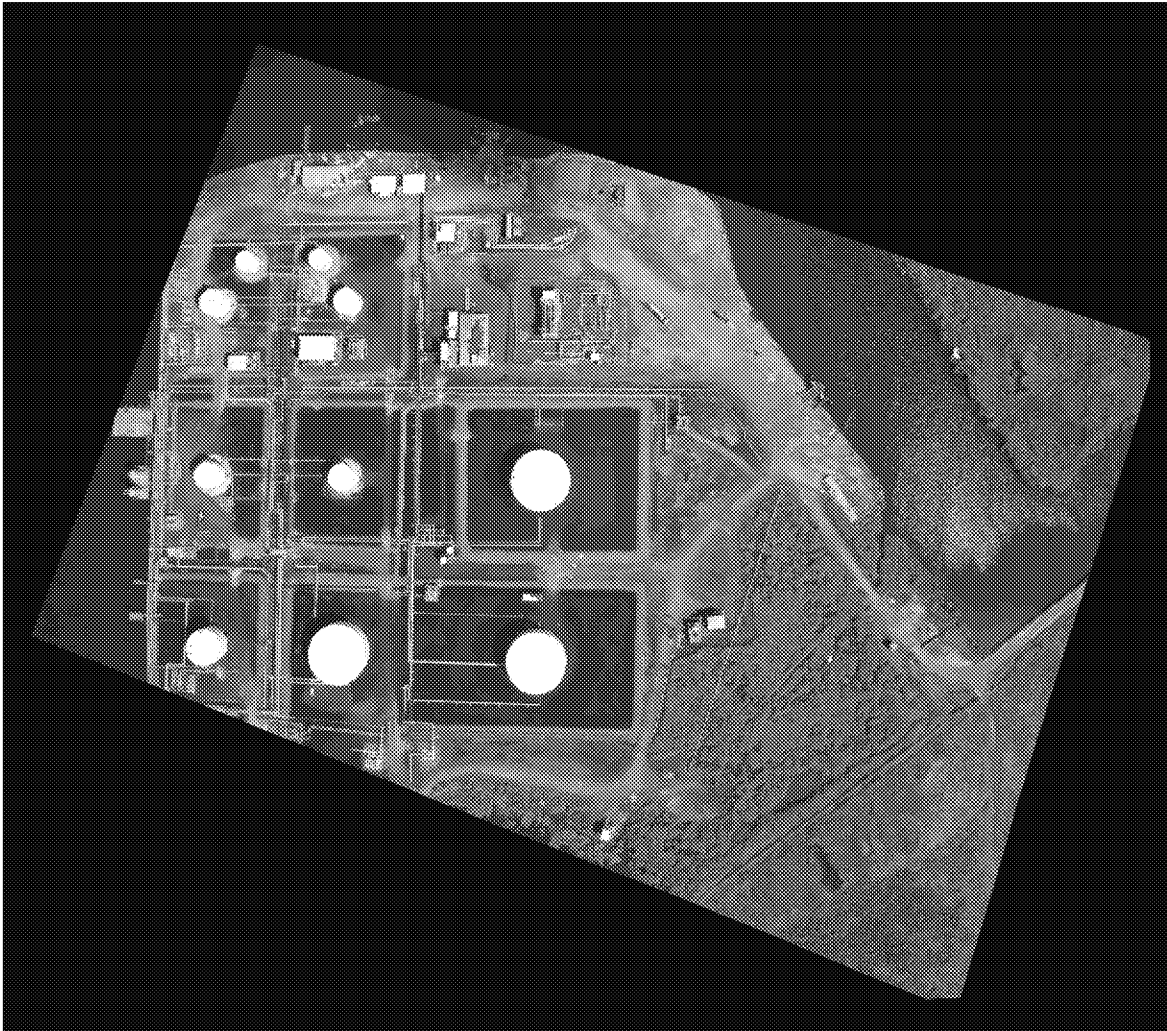


Figure 6. MSIC image of process unit/tank battery near Venice, LA, Flight 7, September 5, 2021



Figure 7. Oblique photo of a damaged oil facility, Flight 7, September 5, 2021

Conclusion

ASPECT conducted two data collection missions on September 5, 2021 with the focus being facilities in the Houma, Louisiana Coastline, St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 32 active data collection passes were made covering 26 facilities. Imagery collected within impact areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

Appendix A: File Names of Data Collected During Flight
Houma and Louisiana Coastline, Flight 7, September 5, 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	14:26:39	5783	150	20210905142645135.jpg 20210905142651499.jpg 20210905142657848.jpg	20210905_142642_A.igm	2021_09_05_14_26_43_R_01 TA=23.8;TB=44.5;Gain=3	
2	15:05:49	1597	107	20210905150555681.jpg 20210905150558395.jpg 20210905150602030.jpg 20210905150605655.jpg 20210905150609290.jpg 20210905150612925.jpg	20210905_150553_A.igm	2021_09_05_15_05_53_R_02 TA=23.3;TB=43.3;Gain=3	
3	15:12:54	1585	105	20210905151300566.jpg 20210905151304201.jpg 20210905151307836.jpg 20210905151310550.jpg 20210905151314186.jpg	20210905_151257_A.igm	2021_09_05_15_12_59_R_03 TA=24.4;TB=44.2;Gain=3	
4	15:28:49	1547	102	20210905152855666.jpg 20210905152859301.jpg 20210905152902936.jpg 20210905152905666.jpg 20210905152909285.jpg	20210905_152853_A.igm	2021_09_05_15_28_54_R_04 TA=24.9;TB=45.0;Gain=3	
5	15:49:04	1582	102	20210905154909526.jpg 20210905154913161.jpg 20210905154916793.jpg 20210905154920418.jpg 20210905154923148.jpg 20210905154926783.jpg	20210905_154907_A.igm	2021_09_05_15_49_08_R_05 TA=27.1;TB=47.2;Gain=3	
6	15:55:08	1554	110	20210905155514507.jpg 20210905155518126.jpg 20210905155521761.jpg 20210905155525389.jpg 20210905155528119.jpg 20210905155531754.jpg 20210905155535389.jpg 20210905155539008.jpg 20210905155541738.jpg 20210905155545373.jpg	20210905_155512_A.igm	2021_09_05_15_55_12_R_06 TA=25.4;TB=45.4;Gain=3	
7	15:59:39	1582	109	20210905155945966.jpg 20210905155949585.jpg 20210905155952315.jpg 20210905155955950.jpg 20210905155959585.jpg 20210905160003205.jpg 20210905160005935.jpg 20210905160009570.jpg 20210905160013205.jpg 20210905160016824.jpg 20210905160019553.jpg 20210905160023188.jpg 20210905160026808.jpg 20210905160030442.jpg 20210905160034077.jpg 20210905160036806.jpg 20210905160040426.jpg	20210905_155943_A.igm 20210905_160022_A.igm	2021_09_05_15_59_44_R_07 TA=24.6;TB=44.7;Gain=3	
8	16:06:38	1600	109	20210905160644505.jpg 20210905160648125.jpg	20210905_160642_A.igm 20210905_160721_A.igm	2021_09_05_16_06_43_R_08 TA=23.5;TB=43.6;Gain=3	

				20210905160651759.jpg 20210905160655394.jpg 20210905160659031.jpg 20210905160701745.jpg 20210905160705380.jpg 20210905160709015.jpg 20210905160712650.jpg 20210905160715364.jpg 20210905160718999.jpg 20210905160722634.jpg 20210905160726269.jpg 20210905160728983.jpg 20210905160732618.jpg			
9	16:33:52	2982	109	20210905163358700.jpg 20210905163405065.jpg 20210905163411414.jpg	20210905_163356_A.igm	2021_09_05_16_33_57_R_09 TA=24.5;TB=44.5;Gain=3	
10	16:45:19	3026	112	20210905164525989.jpg 20210905164532338.jpg 20210905164538687.jpg 20210905164545052.jpg 20210905164551401.jpg 20210905164557766.jpg 20210905164604115.jpg 20210905164610465.jpg	20210905_164523_A.igm 20210905_164601_A.igm	2021_09_05_16_45_24_R_10 TA=24.5;TB=44.3;Gain=3	
11	17:05:35	2929	115	20210905170540750.jpg 20210905170548004.jpg 20210905170554369.jpg	20210905_170538_A.igm	2021_09_05_17_05_40_R_11 TA=24.6;TB=44.7;Gain=3	
12	17:17:48	3031	113	20210905171754318.jpg 20210905171801588.jpg 20210905171807937.jpg	20210905_171751_A.igm	2021_09_05_17_17_53_R_12 TA=25.3;TB=45.5;Gain=3	
13	17:24:43	2972	105	20210905172449235.jpg 20210905172455584.jpg 20210905172501949.jpg 20210905172509203.jpg 20210905172515568.jpg 20210905172521917.jpg 20210905172528266.jpg	20210905_172445_A.igm 20210905_172526_A.igm	2021_09_05_17_24_48_R_13 TA=23.8;TB=43.8;Gain=3	
14	17:33:04	2968	107	20210905173310387.jpg 20210905173316752.jpg 20210905173323101.jpg 20210905173330355.jpg 20210905173336720.jpg 20210905173343069.jpg 20210905173349434.jpg 20210905173355783.jpg 20210905173402132.jpg 20210905173408497.jpg	20210905_173307_A.igm 20210905_173346_A.igm	2021_09_05_17_33_09_R_14 TA=27.9;TB=48.0;Gain=3	
15	17:43:57	2927	98	20210905174403166.jpg 20210905174410420.jpg	20210905_174400_A.igm	2021_09_05_17_44_02_R_15 TA=24.0;TB=44.1;Gain=3	
16	17:59:09	2874	112	20210905175915590.jpg 20210905175921955.jpg 20210905175928304.jpg 20210905175934669.jpg 20210905175941025.jpg 20210905175947380.jpg 20210905175953729.jpg 20210905180000078.jpg 20210905180006443.jpg	20210905_175912_A.igm 20210905_175952_A.igm	2021_09_05_17_59_14_R_16 TA=24.1;TB=44.1;Gain=3	
17	18:15:46	2946	107	20210905181551555.jpg	20210905_181548_A.igm	2021_09_05_18_15_51_R_17 TA=24.8;TB=44.8;Gain=3	

				20210905181558824.jpg 20210905181605174.jpg			
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St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 8, September 5, 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	14:26:39	5783	150	20210905142645135.jpg 20210905142651499.jpg 20210905142657848.jpg	20210905_142642_A.igm	2021_09_05_14_26_43_R_01 TA=23.8;TB=44.5;Gain=3	
2	15:05:49	1597	107	20210905150555681.jpg 20210905150558395.jpg 20210905150602030.jpg 20210905150605655.jpg 20210905150609290.jpg 20210905150612925.jpg	20210905_150553_A.igm	2021_09_05_15_05_53_R_02 TA=23.3;TB=43.3;Gain=3	
3	15:12:54	1585	105	20210905151300566.jpg 20210905151304201.jpg 20210905151307836.jpg 20210905151310550.jpg 20210905151314186.jpg	20210905_151257_A.igm	2021_09_05_15_12_59_R_03 TA=24.4;TB=44.2;Gain=3	
4	15:28:49	1547	102	20210905152855666.jpg 20210905152859301.jpg 20210905152902936.jpg 20210905152905666.jpg 20210905152909285.jpg	20210905_152853_A.igm	2021_09_05_15_28_54_R_04 TA=24.9;TB=45.0;Gain=3	
5	15:49:04	1582	102	2021090515490526.jpg 20210905154913161.jpg 20210905154916793.jpg 20210905154920418.jpg 20210905154923148.jpg 20210905154926783.jpg	20210905_154907_A.igm	2021_09_05_15_49_08_R_05 TA=27.1;TB=47.2;Gain=3	
6	15:55:08	1554	110	20210905155514507.jpg 20210905155518126.jpg 20210905155521761.jpg 20210905155525389.jpg 20210905155528119.jpg 20210905155531754.jpg 20210905155535389.jpg 20210905155539008.jpg 20210905155541738.jpg 20210905155545373.jpg	20210905_155512_A.igm	2021_09_05_15_55_12_R_06 TA=25.4;TB=45.4;Gain=3	
7	15:59:39	1582	109	20210905155945966.jpg 20210905155949585.jpg 20210905155952315.jpg 20210905155955950.jpg 20210905155959585.jpg 20210905160003205.jpg 20210905160005935.jpg 20210905160009570.jpg 20210905160013205.jpg 20210905160016824.jpg 20210905160019553.jpg 20210905160023188.jpg 20210905160026808.jpg 20210905160030442.jpg 20210905160034077.jpg 20210905160036806.jpg 20210905160040426.jpg	20210905_155943_A.igm 20210905_160022_A.igm	2021_09_05_15_59_44_R_07 TA=24.6;TB=44.7;Gain=3	

8	16:06:38	1600	109	20210905160644505.jpg 20210905160648125.jpg 20210905160651759.jpg 20210905160655394.jpg 20210905160659031.jpg 20210905160701745.jpg 20210905160705380.jpg 20210905160709015.jpg 20210905160712650.jpg 20210905160715364.jpg 20210905160718999.jpg 20210905160722634.jpg 20210905160726269.jpg 20210905160728983.jpg 20210905160732618.jpg	20210905_160642_A.igm 20210905_160721_A.igm	2021_09_05_16_06_43_R_08 TA=23.5;TB=43.6;Gain=3	
9	16:33:52	2982	109	20210905163358700.jpg 20210905163405065.jpg 20210905163411414.jpg	20210905_163356_A.igm	2021_09_05_16_33_57_R_09 TA=24.5;TB=44.5;Gain=3	
10	16:45:19	3026	112	20210905164525989.jpg 20210905164532338.jpg 20210905164538687.jpg 20210905164545052.jpg 20210905164551401.jpg 20210905164557766.jpg 20210905164604115.jpg 20210905164610465.jpg	20210905_164523_A.igm 20210905_164601_A.igm	2021_09_05_16_45_24_R_10 TA=24.5;TB=44.3;Gain=3	
11	17:05:35	2929	115	20210905170540750.jpg 20210905170548004.jpg 20210905170554369.jpg	20210905_170538_A.igm	2021_09_05_17_05_40_R_11 TA=24.6;TB=44.7;Gain=3	
12	17:17:48	3031	113	20210905171754318.jpg 20210905171801588.jpg 20210905171807937.jpg	20210905_171751_A.igm	2021_09_05_17_17_53_R_12 TA=25.3;TB=45.5;Gain=3	
13	17:24:43	2972	105	20210905172449235.jpg 20210905172455584.jpg 20210905172501949.jpg 20210905172509203.jpg 20210905172515568.jpg 20210905172521917.jpg 20210905172528266.jpg	20210905_172445_A.igm 20210905_172526_A.igm	2021_09_05_17_24_48_R_13 TA=23.8;TB=43.8;Gain=3	
14	17:33:04	2968	107	20210905173310387.jpg 20210905173316752.jpg 20210905173323101.jpg 20210905173330355.jpg 20210905173336720.jpg 20210905173343069.jpg 20210905173349434.jpg 20210905173355783.jpg 20210905173402132.jpg 20210905173408497.jpg	20210905_173307_A.igm 20210905_173346_A.igm	2021_09_05_17_33_09_R_14 TA=27.9;TB=48.0;Gain=3	
15	17:43:57	2927	98	20210905174403166.jpg 20210905174410420.jpg	20210905_174400_A.igm	2021_09_05_17_44_02_R_15 TA=24.0;TB=44.1;Gain=3	
16	17:59:09	2874	112	20210905175915590.jpg 20210905175921955.jpg 20210905175928304.jpg 20210905175934669.jpg 20210905175941025.jpg 20210905175947380.jpg 20210905175953729.jpg 20210905180000078.jpg 20210905180006443.jpg	20210905_175912_A.igm 20210905_175952_A.igm	2021_09_05_17_59_14_R_16 TA=24.1;TB=44.1;Gain=3	

17	18:15:46	2946	107	20210905181551555.jpg 20210905181558824.jpg 20210905181605174.jpg	20210905_181548_A.igm	2021_09_05_18_15_51_R_17 TA=24.8;TB=44.8;Gain=3	
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**Appendix B: Priority Sites Provided by EPA Region 6 & Louisiana Department of
Environmental Quality**

Facility_Name	Latitude	Longitude	Parish
Deltech LLC - Baton Rouge Facility	30.552892	-91.200536	East Baton Rouge
ExxonMobil Chemical Co - Baton Rouge Plastics Plant	30.551419	-91.175611	East Baton Rouge
ExxonMobil Baton Rouge Chemical Plant	30.484336	-91.169644	East Baton Rouge
Marathon Petroleum Co LP	30.068394	-90.596364	St. John the Baptist
Westlake Vinyls Co LP	30.209167	-91.017222	Ascension
Valero Refining - Meraux LLC - Meraux Refinery	29.930222	-89.944917	St. Bernard
Cornerstone Chemical Company	29.964722	-90.264722	Jefferson
Chalmette Refining LLC	29.937903	-89.969903	St. Bernard
ExxonMobil Chemical Company - Baton Rouge Chemicals North Plant	30.50465	-91.173219	East Baton Rouge
Equilon Enterprises LLC - Norco Refinery	29.995372	-90.410167	St. Charles
The Dow Chemical Company - Louisiana Operations	30.313927	-91.240586	Iberville
Rubicon LLC - Geismar Facility	30.20139	-91.01222	Ascension
BASF Corp - Geismar Site	30.18425	-91.002778	Ascension
Union Carbide Corp - St. Charles Plant	29.982289	-90.455622	St. Charles
Phillips 66 Co - Alliance Refinery	29.68406	-89.98145	Plaquemines
Axiall LLC - Plaquemine Facility	30.267167	-91.184258	Iberville
ExxonMobil Fuels & Lubricants Co - Baton Rouge Refinery	30.484392	-91.169444	East Baton Rouge
Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery	30.107684	-90.890796	St. James
Marathon Petroleum Company LP - Louisiana Refining Division - Garyville Refinery	30.061322	-90.593528	St. John the Baptist
BASF Corp - Zachary Site	29.547603	-90.523231	East Baton Rouge
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188	Ascension
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497	St. Charles
ExxonMobil Chemical Co - Baton Rouge Polyolefins Plant	30.56215	-91.20387	East Baton Rouge
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381	St. Charles
NOVA Chemicals Olefins LLC - Geismar Ethylene Plant	30.230619	-91.052884	Ascension
Roehm America LLC - MMA Plant	29.9575	-90.265833	Jefferson
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955	St. Charles
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.409722	St. Charles
BASF Corp - North Geismar Site	30.20594	-90.99195	Ascension
Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339	Plaquemines
Shintech Louisiana LLC - Shintech Plaquemine Plant	30.273611	-91.173333	Iberville
Denka Performance Elastomer LLC	30.053928	-90.524792	St. John the Baptist

Formosa Plastics Corp Louisiana	30.501722	-91.185944	East Baton Rouge
DuPont Specialty Products USA LLC - Pontchartrain Site	30.05388	-90.52472	St. John the Baptist
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722	St. Charles
Syngenta Crop Protection LLC - St Gabriel Plant	30.246728	-91.103508	Iberville
Mosaic Fertilizer LLC - Faustina Plant	30.083914	-90.91345	St. James
Mosaic Fertilizer LLC - Uncle Sam Plant	30.037222	-90.8275	St. James
LBC Baton Rouge LLC - Sunshine Terminal	30.294444	-91.148333	Iberville
Occidental Chemical Corporation - Convent Facility	30.055885	-90.830594	St. James
TOTAL Petrochemicals & Refining USA Inc - Carville Polystyrene Plant	30.229786	-91.073631	Iberville
Targa Midstream Services LLC	29.237034	-89.384977	Plaquemines
EnLink LIG Liquids LLC - Plaquemine Gas Processing Plant	30.236389	-91.241389	Iberville
EnLink LIG Liquids LLC - Gibson Gas Processing Plant	29.643056	-90.961944	Terrebonne
NuStar Logistics LP - St James Terminal	30.030065	-90.843463	St. James
Enterprise Gas Processing LLC - Norco Fractionation Plant	30.015411	-90.402958	St. Charles
Lone Star NGL Refinery Services LLC - Geismar Fractionation Plant	30.218889	-91.035833	Ascension
INEOS Oxide - A Division of INEOS Americas LLC	30.313889	-91.240278	Iberville
Discovery Producer Services LLC - Discovery Paradis Fractionation Plant	29.858889	-90.453333	St. Charles
Plains Marketing LP - St James Terminal	30.004341	-90.848449	St. James
Methanex USA Services LLC - Geismar Methanol Plant	30.206667	-91.020833	Ascension
Dyno Nobel LA Ammonia LLC - Ammonia Production Facility	29.964789	-90.264625	Jefferson
Kinder Morgan Liquids Terminals LLC - Geismar Methanol Terminal	30.205389	-91.023792	Ascension
South LA Methanol LP - St James Methanol Plant	30.039917	-90.863819	St. James
YCI Methanol Plant	29.97481	-90.86775	St. James
IGP Methanol LLC - Gulf Coast Methanol Complex	29.625453	-89.926611	Plaquemines
KMe St James Holdings LLC - Methanol Terminal	29.990919	-90.841239	St. James
Kemira Chemicals Inc	29.964722	-90.264722	Jefferson
PHILLIPS 66 PIPELINE LLC	29.923889	-90.482498	St. Charles
CF INDUSTRIES	30.08328	-90.957665	Ascension

Appendix C: ASPECT Systems

The US EPA ASPECT system collects airborne infrared (IR) images and chemical screening data from a safe distance over the site (about 3,000 ft AGL). The system consists of an airborne high-speed Fourier Transform Infra-Red (FTIR) spectrometer coupled with a wide-area IR Line Scanner (IRLS). The ASPECT IR systems can detect chemical compounds in both the 8-to-12-micron (800 to 1200 cm^{-1}) and 3 to 5 micron (2000 to 3200 cm^{-1}) regions. List of chemicals and detection limits are listed in Table 1. The 8 to 12 micron region is typically known as the atmospheric window region since the band is reasonably void of water and carbon dioxide influence. Spectrally, this region is used to detect carbon - non-carbon bonded compounds. The 3 to 5 micron region is also free of water and carbon dioxide but typically does not have sufficient energy for use. This band does show use in high-energy environments such as fires. The carbon - hydrogen stretch is very common in this region.

An Imperx mapping camera (29 mega pixels; mapping focal plane array) is concurrently operated as part of all chemical collections. These images are often digitally processed in lower resolution, so they can be transmitted via satellite communication. All imagery is geo-rectified using both aircraft attitude correction (pitch, yaw, and roll) and GPS positional information. Imagery can be processed while in flight or approximately 600 frames per hour can be processed once the data are downloaded from the aircraft. The high-resolution images (>20 MB each) are pulled from the ASPECT after the sortie and are available later.

All aerial photographic images collected by the ASPECT system are ortho-rectified and geospatially validated by the scientific reach back team. In general, this consists of conducting geo-registration using a USGS Digital Elevation Model (DEM) which promotes superior pixel computation and lessens topographic distortion. The image is checked by the team (using a Google Earth base map) for proper location and rotation.

Airborne radiological measurements are conducted using three fully integrated multi-crystal sodium iodide (NaI) RSX4 gamma ray spectrometers. Each RSX4 spectrometer contains four 4"x2"x16" doped NaI crystals each having an independent photomultiplier/spectrometer assembly. One RSX unit is configured with an additional upward NaI crystal utilized to provide real-time cosmic ray correction. Count and energy data from each crystal and pack is combined using a self-calibrating signal processor to generate a virtual detector output. All radiological spectrometer "packs" are further combined using a signal console controlled by the on-board central computer in the aircraft. Altitude correction data is provided by a radar altimeter with internal GPS systems within the packs serving as a backup. It should be noted that no radiological measurements were conducted on this mission.

Data is processed using automated algorithms onboard the aircraft with preliminary results being sent using a satellite system to the ASPECT scientific reach back team for QA/QC analysis. Upon landing, preliminary data results are examined and validated by the

scientific reach back team.

Table 1. ASPECT Automated Compounds

This table contains ASPECT's library of automated compounds.

Detection limits are for each chemical is found in parenthesis in units of parts per million (ppm)

Acetic Acid (2.0)	Cumene (23.1)	Isoprene (6.5)	Phosphine (8.3)
Acetone (5.6)	Diborane (5.0)	Isopropanol (8.5)	Phosphorus Oxychloride (2.0)
Acrolein (8.8)	1,1-Dichloroethene (3.7)	Isopropyl Acetate (0.7)	Propyl Acetate (0.7)
Acrylonitrile (12.5)	Dichloromethane (6.0)	MAPP (3.7)	Propylene (3.7)
Acrylic Acid (3.3)	Dichlorodifluoromethane (0.7)	Methyl Acetate (1.0)	Propylene Oxide (6.8)
Allyl Alcohol (5.3)	1,1-Difluoroethane (0.8)	Methyl Acrylate (1.0)	Silicon Tetrafluoride (0.2)
Ammonia (2.0)	Difluoromethane (0.8)	Methyl Ethyl Ketone (7.5)	Sulfur Dioxide (15)
Arsine (18.7)	Ethanol (6.3)	Methanol (5.4)	Sulfur Hexafluoride (0.07)
Bis-Chloroethyl Ether (1.7)	Ethyl Acetate (0.8)	Methylbromide (60)	Sulfur Mustard (6.0)
Boron Tribromide (0.2)	Ethyl Acrylate (0.8)	Methylene Chloride (1.1)	Sulfuryl Fluoride (1.5)
Boron Trifluoride (5.6)	Ethyl Formate (1.0)	Methyl Methacrylate (3.0)	Tetrachloroethylene (10)
1,3-Butadiene (5.0)	Ethylene (5.0)	MTEB (3.8)	1,1,1-Trichloroethane (1.9)
1-Butene (12.0)	Formic Acid (5.0)	Naphthalene (3.8)	Trichloroethylene (2.7)
2-Butene (18.8)	Freon 134a (0.8)	n-Butyl Acetate (3.8)	Trichloromethane (0.7)
Carbon Tetrachloride (0.2)	GA (Tabun) (0.7)	n-Butyl Alcohol (7.9)	Triethylamine (6.2)
Carbonyl Fluoride (0.8)	GB (Sarin) (0.5)	Nitric Acid (5.0)	Triethylphosphate (0.3)
Carbon Tetrafluoride (0.1)	Germane (1.5)	Nitrogen Mustard (2.5)	Trimethylamine (9.3)
Chlorodifluoromethane (0.6)	Hexafluoroacetone (0.4)	Nitrogen Trifluoride (0.7)	Trimethyl Phosphite (0.4)
Chloromethane (12)	Isobutylene (15)	Phosgene (0.5)	Vinyl Acetate (0.6)

Message

From: Taylor, Jillianne [Taylor.Jillianne@epa.gov]
Sent: 9/8/2021 9:14:46 PM
To: Loesel, Matthew [loesel.matthew@epa.gov]
Subject: RE: ASPECT Report for September 7, 2021
Attachments: ASPECT Summary - Hurricane Ida 7 September 2021 V2.docx

Hi Matt,

Here is the updated report.

Thanks!
Jill

From: Loesel, Matthew <loesel.matthew@epa.gov>
Sent: Wednesday, September 8, 2021 12:42 PM
To: Taylor, Jillianne <Taylor.Jillianne@epa.gov>
Subject: FW: ASPECT Report for September 7, 2021

From: I <subracom@aol.com>
Sent: Wednesday, September 8, 2021 12:40 PM
To: Loesel, Matthew <loesel.matthew@epa.gov>
Subject: Re: ASPECT Report for September 7, 2021

The report is missing Figure 3.

Figure 4 should have included the name of the facility in the Garyville area.

Figure 5 Image of Garyville, LA Refinery, is associated with Marathon and should be so indicated.

Wilma Subra

-----Original Message-----

From: Loesel, Matthew <loesel.matthew@epa.gov>
To: SubraCom@aol.com <SubraCom@aol.com>
Sent: Wed, Sep 8, 2021 10:36 am
Subject: ASPECT Report for September 7, 2021

Ms. Subra –

Please find attached a copy of the Draft Report from the ASPECT flight on September 7 in response to Hurricane Ida for review and comments. The report for yesterday should be available later today as well. Thank you for your attention to this.

Matthew Loesel
U.S. EPA – Federal On-Scene Coordinator
1201 Elm Street
Suite 500 (6SED-EC)

Dallas, Texas 75270
(214) 738 0674 (mobile)
(214) 665 8544 (office)
loesel.matthew@epa.gov

Airborne Spectral Photometric Environmental Collection Technology

ASPECT Air Quality Survey after Hurricane Ida Baton Rouge, LA September 7, 2021



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Acronyms and Abbreviations

Alt	Altitude (in feet)
AGL	Above Ground Level
cm	centimeter
CDT	Central Daylight Time
DEM	Digital Elevation Model
ESF-10	Emergency Support Function #10 – Oil and Hazardous Materials Response
FEMA	Federal Emergency Management Agency
FTIR	Fourier Transform Infrared Spectrometer
FTP	File Transfer Protocol
igm	Spectral data format based on grams format
IR	Infrared
IRLS	Infrared Line Scanner
jpg	JPEG image format
kts	knots
mph	miles per hour
m/s	meters per second
MSIC	Digital photography file from the Imperx mapping camera
MSL	Mean Sea Level Altitude (in feet)
PAN	peroxyacetyl nitrate
Ppm	parts per million
RMP	Risk Management Plan

UTC

Universal Time Coordinated

Executive Summary

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 29 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2nd, 2021, the State of Louisiana requested ESF-10 assistance through FEMA and Region 6 asked for the ASPECT plane to be deployed in support of the response to Hurricane Ida. The state wanted assistance monitoring facility emissions in the industrial area between Baton Rouge and New Orleans, where flaring is resulting in the visible emission of black smoke.

ASPECT was tasked to perform remote chemical sensing over target properties to screen for airborne chemicals and take high-resolution photos to provide situational awareness. Potential areas identified for monitoring included: East Baton Rouge, Ascension, Iberville, St. James, St. John, St. Charles, Jefferson, and Orleans. The system conducted one flight mission on September 2 including air monitoring survey collections over the target area with favorable weather conditions for all passes. Although two black plumes were visible over one of the sites, no major emissions were detected with the FTIR.

A continuation of the overall Baton Rouge facility survey was conducted on 3 September 2021. Two data collection flights were conducted which bracketed a Presidential temporary flight restriction not allowing any flight activity. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Flight 5 and 6 were conducted as part of survey operations conducted on 4 September 2021. A total of 17 facilities were surveyed. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm in addition to ozone and peroxyacetyl nitrate. Analysis of IR imagery indicated that some facilities are showing hot process units.

ASPECT conducted two data collection missions on September 5 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 32 active data collection passes were made covering 21 facilities. Imagery collected within impact areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

Two data collection missions were conducted by ASPECT on September 7 with the primary focus to collect additional data over targets surveyed with single passes on

September 5 (St. Bernard, Terrebonne, St. Charles, and St. James areas). A total of 16 data collection passes (2 test and 14 active) were made over 13 facilities. Weather conditions complicated the mission with numerous convective cells and low clouds in the area. No compounds were detected on either flight. ASPECT conducted two data collection missions on September 7 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas.

ASPECT Air Quality Survey

Hurricane IDA

Baton Rouge, LA

September 7, 2021

Background and Operational Overview

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 29 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2, 2021, ASPECT was tasked to conduct a wide area air quality screening level assessment of areas populated with Risk Management Plan (RMP) sites and petrochemical facilities using the ASPECT system for detections of any airborne contaminants from ASPECT's 76 chemical detection library in the areas affected by Ida. The Region wanted to know if any detections were found, the location of the detection, and the concentration detected. Sites including Marathon Petroleum Company, Shell Norco Facility, and Phillips 66 pipeline site were surveyed. There were no chemical detections at the sites surveyed. Extremely slow satellite transmission speeds (possibly due to high bandwidth use by other first responders) resulted in long delays in data collection. Some chemical photos were pulled down during flight, with the majority needing to be pulled down with a more high-speed internet connection on the ground.

On September 3, ASPECT was tasked with a continuation of the general Baton Rouge area survey and conducted two flights. 8 locations in the Baton Rouge area were surveyed as part of two flights. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Two data collection flights were conducted on September 4 focusing on facilities south of Baton Rouge. A total of 29 active data collection passes were made covering 17 facilities. Analysis of IR imagery indicated that some facilities are showing hot process units. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm.

ASPECT conducted two data collection missions on September 5 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 32 active data collection passes were made covering 21 facilities. Imagery collected within impact areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

Due to poor weather, ASPECT did not conduct any flight activities on September 6. ASPECT was tasked with two missions on September 7 consisting largely of revisiting facilities surveyed on September 5 for the purpose of collecting additional data.

Table 1. Sites Covered on September 7, 2021 Flights 9 and 10

Facility Name	Latitude	Longitude	Parish
Marathon Petroleum Co LP	30.068394	-90.596364	St. John the Baptist
Marathon Petroleum Company LP - Louisiana Refining Division - Garyville Refinery	30.061322	-90.593528	St. John the Baptist
BASF Corp - Zachary Site	29.547603	-90.523231	East Baton Rouge
Denka Performance Elastomer LLC	30.053928	-90.524792	St. John the Baptist
Mosaic Fertilizer LLC - Uncle Sam Plant	30.037222	-90.8275	St. James
Occidental Chemical Corporation - Convent Facility	30.055885	-90.830594	St. James
Discovery Producer Services LLC - Discovery Paradis Fractionation Plant	29.858889	-90.453333	St. Charles
Plains Marketing LP - St James Terminal	30.004341	-90.848449	St. James
South LA Methanol LP - St James Methanol Plant	30.039917	-90.863819	St. James
YCI Methanol Plant	29.97481	-90.86775	St. James
IGP Methanol LLC - Gulf Coast Methanol Complex	29.625453	-89.926611	Plaquemines
KMe St James Holdings LLC - Methanol Terminal	29.990919	-90.841239	St. James
Port Fourchon Oil	29.133491	-90.201808	Lafourche

General Mission Objectives

Once granted access to fly over the sites, the following general mission objectives were employed in conducting data collection with ASPECT:

1. To capture an overall, situational awareness of the incident using aerial photography with:
 - Oblique camera—photos taken by hand from the view/position of the co-pilot, and
 - MSIC photos—advanced camera mounted underneath the plane for a top-down view of the designated sites.
2. To qualitatively locate and characterize any the visible and non-visible components of a plume, as well as any areas on fire:
 - Using the Infrared Line Scanner (IRLS)

3. To screen for the presence and location of specific chemicals within ASPECT's automated chemical detection library:
 - Using the Fourier Transform Infrared (FTIR) Spectrometer

Flight Conditions and Status

Weather and Site Conditions

Prior to each flight, an updated status of the current and forecasted weather, site conditions and any potential flight obstacles including radio towers impacting safety is assessed by the crew. A summary of the ground weather conditions during the missions can be found in Tables 2 and 3.

**Table 2. Ground Weather for Baton Rouge, LA, Flight 9
September 7, 2021**

Time	853	953	1053	1153	1253
Wind direction	202.5 degrees SSW	202.5 degrees SSW	202.5 degrees SSW	202.5 degrees SSW	270 degrees W
Wind speed	3.1 m/s (7.0 mph)	3.6 m/s (8.0 mph)	4.0 m/s (9.0 mph)	4.0 m/s (9.0 mph)	2.7 m/s (6.0 mph)
Temperature	23.9 C	25.6 C	28.3 C	30.0 C	31.7 C
Relative humidity	66	60	55	53	50
Dew point	17.2 C	17.8 C	18.3 C	19.4 C	20.0 C
Pressure	980.7 mb	980.4 mb	980.4 mb	980.0 mb	980.0 mb
Ceiling	Clear	Clear	Clear	Clear	Clear

**Table 3. Ground Weather for Baton Rouge, LA, Flight 10
September 7, 2021**

Time	1353	1453	1553	1653	1753
Wind direction	270 degrees W	315 degrees NW	337.5 degrees NNW	0 degrees N	337.5 degrees NNW
Wind speed	4.5 m/s (10.0 mph)	4.0 m/s (9.0 mph)	4.0 m/s (9.0 mph)	6.3 m/s (14.0 mph)	4.0 m/s (9.0 mph)
Temperature	32.2 C	33.3 C	32.8 C	32.2 C	30.6 C
Relative humidity	52	51	49	40	45
Dew point	21.1 C	21.7 C	20.6 C	16.7 C	17.2 C
Pressure	980.0 mb	980.0 mb	980.0 mb	980.4 mb	980.7 mb
Ceiling	Clear	Clear	Few 4800 Ft	Clear	Clear

Data Results

The following data is provided as a summary analysis. All data products are available for the Region to access on a shared FTP site. For a complete list of available products, see Appendix A. The data collected during these missions included a flight path summary,

IRLS images, FTIR chemical identification and quantification, high resolution MSIC photos, and oblique photos.

Flight Paths

Wide, slow turns are required to be made in between runs to keep the instruments stable. The blue lines indicate the flight path while the green lines indicate the specific sections of the flight where chemical data was collected and processed. On Flights 9 and 10, the St. Bernard, Terrebonne, St. Charles, and St. James areas were surveyed, and the flight paths are shown in Figures 1 and 2.

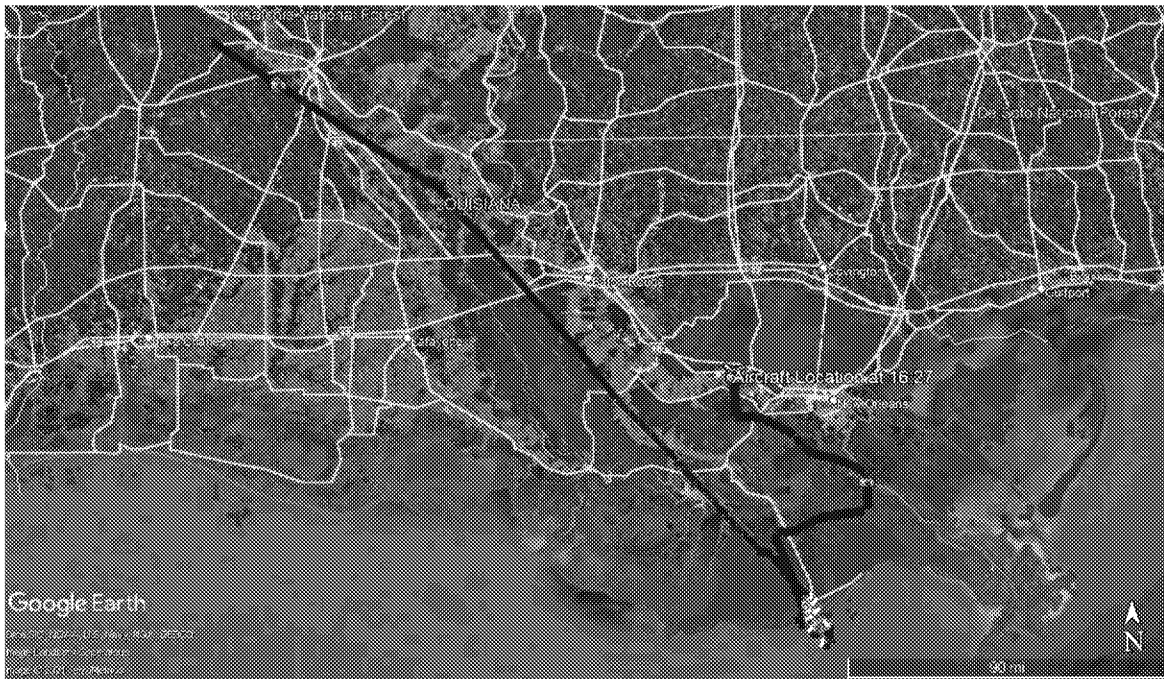


Figure 1. Data Collection Flight Path,
St. Bernard, Terrebonne, St. Charles, and St. James, Flight 9,
September 7, 2021



Figure 2. Data Collection Flight Path,
St. Bernard, Terrebonne, St. Charles, and St. James, Flight 10,
September 7, 2021

Line Scanner Data Results

A total of 16 data collection runs (2 test and 14 active) were made over the target facilities and an infrared line scanner image was generated for each collection run. Figure 3 shows a 3-band infrared image collected over the Marathon Petroleum Company near Garyville. No significant features are evident in the image (such as flare or steam vents) and no discharges can be seen leaving the facility.



Figure 3. Three band IR image, Marathon Petroleum Company, Run 11, Flight 9, September 7, 2021

FTIR Data Results

FTIR spectral data at a resolution of 16 wavenumbers was collected for each run. ASPECT uses an automated detection algorithm to permit compounds to be automatically analyzed

while the aircraft is in flight. Seventy-six chemical compounds are included in the airborne algorithm library (the list is provided in Appendix C, Table 1). In addition, collected data was also manually quality checked against a collection of published library spectra for each chemical detected.

ASTECT did not detect any programmed compounds (those found in Appendix C, Table 1) as part of the mission over the target areas on the two flights conducted on September 7. Details of the monitoring results can be found in Tables 4 and 5.

**Table 4. Chemical Results Summary
St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 9**

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-07	14:06:47	Test	Test
2		15:34:20	ND	ND
3		16:05:22	ND	ND
4		16:26:25	ND	ND

**Table 5. Chemical Results Summary
St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 10**

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-07	19:03:23	Test	Test
2		19:22:25	ND	ND
3		19:52:24	ND	ND
4		19:54:57	ND	ND
5		20:11:16	ND	ND
6		20:12:24	ND	ND
7		20:28:48	ND	ND
8		20:41:54	ND	ND
9		20:54:50	ND	ND
10		21:06:26	ND	ND
11		21:16:22	ND	ND
12		21:30:25	ND	ND

Aerial Photography Results

A full set of high-resolution aerial digital photography were collected as part of each data collection pass. Weather conditions over the survey were challenging with both low ceiling and convective activity within the survey areas. These conditions made some images marginal. Figures 4 shows a representative aerial image collected over the Marathon

Petroleum Company in the Garyville area. No significant damage or activity is evident in the image. Figure 5 shows an oblique image of a flooded tank battery near Port Fourchon. Although flooded, no product appears to be leaking from the facility.

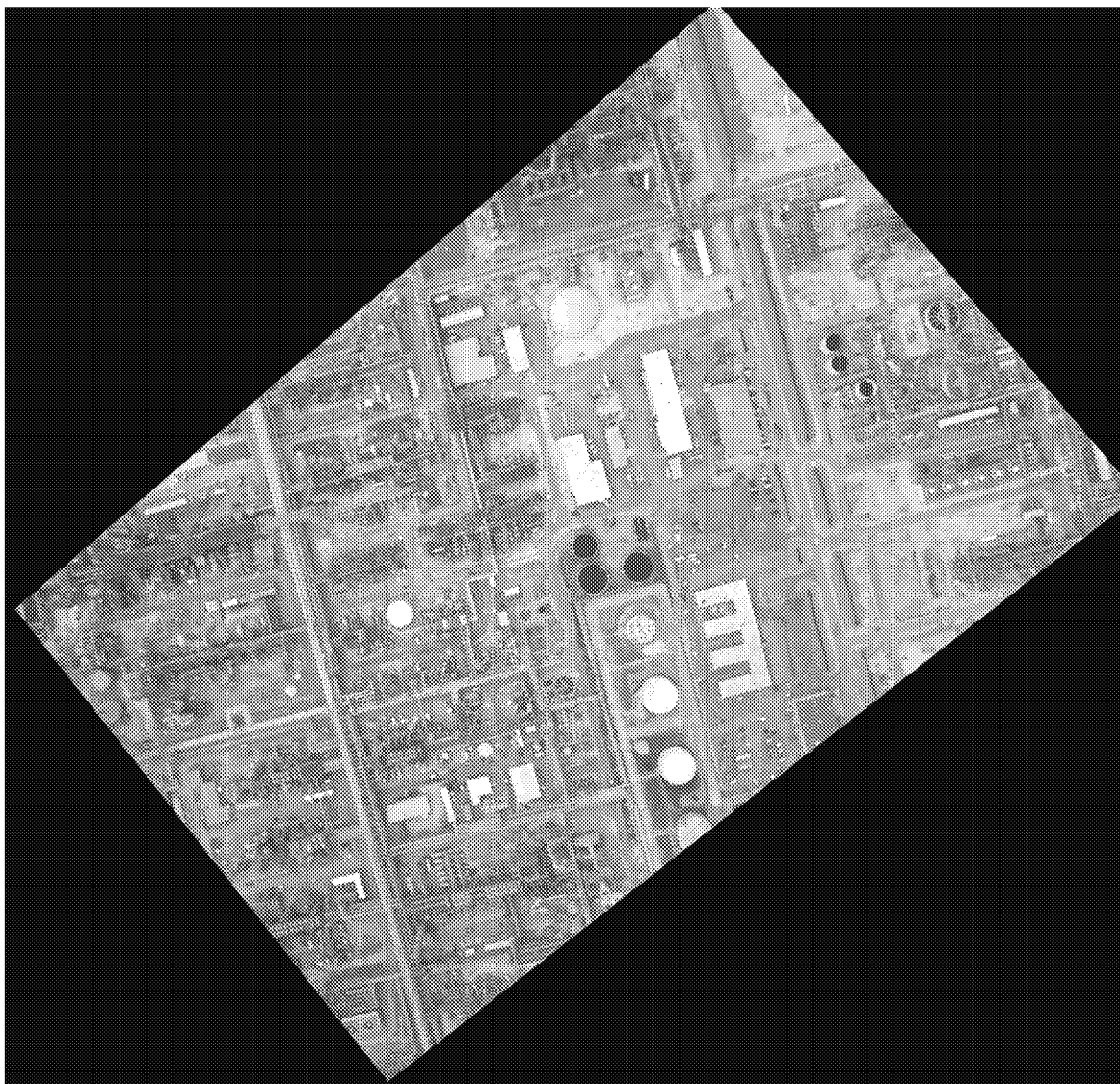


Figure 4. MSIC image of the Marathon Petroleum Company, Garyville, LA, Flight 10, September 7, 2021

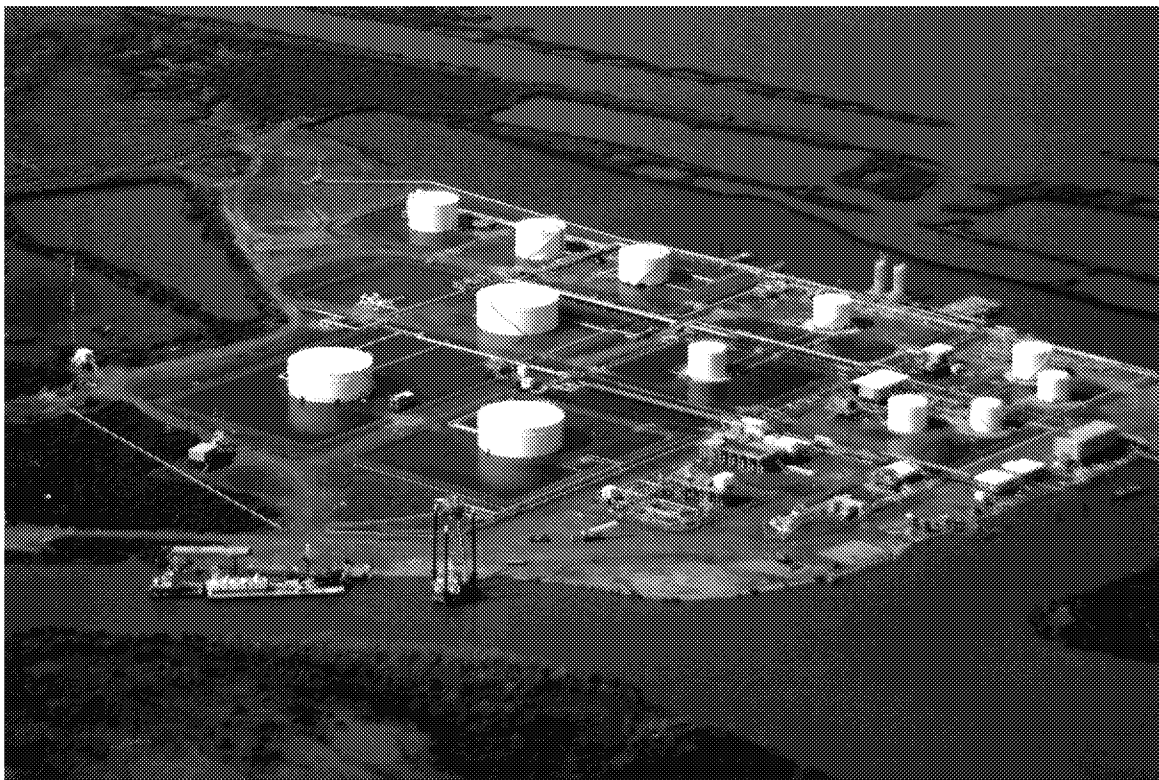


Figure 5. Oblique photo of a flooded tank battery, Flight 9, September 7, 2021

Conclusion

Two data collection missions were conducted by ASPECT on September 7, 2021 with the primary focus to collect additional data over targets surveyed with single passes on 5 September 2021 (St. Bernard, Terrebonne, St. Charles, and St. James areas). A total of 16 data collection passes (2 test and 14 active) were made over about half of the target list. Weather conditions complicated the mission with numerous convective cells and low clouds in the area. No compounds were detected on either flight.

Appendix A: File Names of Data Collected During Flight

St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 9, September 7, 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	14:06:47	5147	150	20210907140653888.jpg 20210907140700247.jpg 20210907140706596.jpg	20210907_140651_A.igm	2021_09_07_14_06_51_R_01 TA=25.0;TB=45.5;Gain=3	
2	15:34:20	2563	105	20210907153426146.jpg 20210907153432495.jpg 20210907153438860.jpg 20210907153445210.jpg 20210907153451568.jpg 20210907153457918.jpg 20210907153505181.jpg 20210907153511546.jpg	20210907_153423_A.igm 20210907_153502_A.igm	2021_09_07_15_34_24_R_02 TA=16.0;TB=36.0;Gain=3	
3	16:05:22	2534	108	20210907160528252.jpg 20210907160534601.jpg 20210907160540960.jpg	20210907_160525_A.igm	2021_09_07_16_05_26_R_03 TA=25.1;TB=45.0;Gain=3	
4	16:26:25	2063	107	20210907162632040.jpg 20210907162637485.jpg 20210907162642033.jpg 20210907162647478.jpg 20210907162652923.jpg	20210907_162628_A.igm	2021_09_07_16_26_30_R_04 TA=26.0;TB=46.0;Gain=3	

St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 10, 7 September 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	19:03:23	2589	114	20210907190329891.jpg 20210907190335335.jpg 20210907190340787.jpg	20210907_190327_A.igm	2021_09_07_19_03_28_R_01 TA=25.9;TB=46.7;Gain=3	
2	19:22:25	2572	102	20210907192232007.jpg 20210907192237452.jpg 20210907192242896.jpg 20210907192248344.jpg 20210907192253803.jpg 20210907192259248.jpg	20210907_192229_A.igm	2021_09_07_19_22_30_R_02 TA=26.0;TB=46.2;Gain=3	
3	19:52:24	2535	106	20210907195230529.jpg 20210907195235973.jpg 20210907195241418.jpg 20210907195246872.jpg 20210907195252316.jpg 20210907195257760.jpg 20210907195303220.jpg 20210907195308665.jpg 20210907195314109.jpg 20210907195319553.jpg	20210907_195227_A.igm 20210907_195306_A.igm	2021_09_07_19_52_29_R_03 TA=25.9;TB=46.0;Gain=3	
4	19:54:57	2507	104	20210907195503059.jpg 20210907195508503.jpg 20210907195513947.jpg 20210907195519392.jpg 20210907195524836.jpg 20210907195530296.jpg 20210907195535740.jpg	20210907_195501_A.igm	2021_09_07_19_55_01_R_04 TA=26.0;TB=46.0;Gain=3	

5	20:11:16	2576	105	20210907201122663.jpg 20210907201128108.jpg 20210907201133568.jpg	20210907_201120_A.igm	2021_09_07_20_11_21_R_05 TA=26.0;TB=46.0;Gain=3	
6	20:12:24	2549	102	20210907201230757.jpg 20210907201236202.jpg 20210907201238932.jpg	20210907_201227_A.igm	2021_09_07_20_12_29_R_06 TA=26.0;TB=46.0;Gain=3	
7	20:28:48	2563	106	20210907202854916.jpg 20210907202900361.jpg 20210907202905805.jpg 20210907202911250.jpg 20210907202916710.jpg 20210907202922154.jpg 20210907202927604.jpg 20210907202933048.jpg 20210907202938492.jpg 20210907202943937.jpg 20210907202949381.jpg 20210907202954841.jpg 20210907203000286.jpg 20210907203005730.jpg	20210907_202851_A.igm 20210907_202932_A.igm	2021_09_07_20_28_54_R_07 TA=25.1;TB=44.9;Gain=3	
8	20:41:54	2593	110	20210907204200238.jpg 20210907204205682.jpg 20210907204211142.jpg 20210907204216587.jpg	20210907_204156_A.igm	2021_09_07_20_41_58_R_08 TA=27.3;TB=47.1;Gain=3	
9	20:54:50	2552	105	20210907205456491.jpg 20210907205501935.jpg 20210907205507380.jpg 20210907205512825.jpg 20210907205518285.jpg 20210907205523730.jpg	20210907_205453_A.igm	2021_09_07_20_54_55_R_09 TA=18.3;TB=38.5;Gain=3	
10	21:06:26	2544	101	20210907210632840.jpg 20210907210638285.jpg 20210907210643729.jpg 20210907210649189.jpg 20210907210654634.jpg 20210907210700078.jpg 20210907210705523.jpg 20210907210710967.jpg 20210907210716427.jpg 20210907210721871.jpg	20210907_210630_A.igm 20210907_210710_A.igm	2021_09_07_21_06_32_R_10 TA=25.6;TB=45.5;Gain=3	
11	21:16:22	2578	103	20210907211628411.jpg 20210907211633863.jpg 20210907211639307.jpg 20210907211644767.jpg 20210907211650212.jpg 20210907211655656.jpg 20210907211701101.jpg 20210907211706545.jpg 20210907211711993.jpg 20210907211717439.jpg 20210907211722899.jpg	20210907_211625_A.igm 20210907_211705_A.igm	2021_09_07_21_16_27_R_11 TA=23.5;TB=43.5;Gain=3	
12	21:30:25	2570	108	20210907213031849.jpg 20210907213037293.jpg 20210907213042753.jpg	20210907_213029_A.igm	2021_09_07_21_30_31_R_12 TA=23.0;TB=42.8;Gain=3	

**Appendix B: Priority Sites Provided by EPA Region 6 & Louisiana Department of
Environmental Quality**

Facility_Name	Latitude	Longitude	Parish
Deltech LLC - Baton Rouge Facility	30.552892	-91.200536	East Baton Rouge
ExxonMobil Chemical Co - Baton Rouge Plastics Plant	30.551419	-91.175611	East Baton Rouge
ExxonMobil Baton Rouge Chemical Plant	30.484336	-91.169644	East Baton Rouge
Marathon Petroleum Co LP	30.068394	-90.596364	St. John the Baptist
Westlake Vinyls Co LP	30.209167	-91.017222	Ascension
Valero Refining - Meraux LLC - Meraux Refinery	29.930222	-89.944917	St. Bernard
Cornerstone Chemical Company	29.964722	-90.264722	Jefferson
Chalmette Refining LLC	29.937903	-89.969903	St. Bernard
ExxonMobil Chemical Company - Baton Rouge Chemicals North Plant	30.50465	-91.173219	East Baton Rouge
Equilon Enterprises LLC - Norco Refinery	29.995372	-90.410167	St. Charles
The Dow Chemical Company - Louisiana Operations	30.313927	-91.240586	Iberville
Rubicon LLC - Geismar Facility	30.20139	-91.01222	Ascension
BASF Corp - Geismar Site	30.18425	-91.002778	Ascension
Union Carbide Corp - St. Charles Plant	29.982289	-90.455622	St. Charles
Phillips 66 Co - Alliance Refinery	29.68406	-89.98145	Plaquemines
Axiall LLC - Plaquemine Facility	30.267167	-91.184258	Iberville
ExxonMobil Fuels & Lubricants Co - Baton Rouge Refinery	30.484392	-91.169444	East Baton Rouge
Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery	30.107684	-90.890796	St. James
Marathon Petroleum Company LP - Louisiana Refining Division - Garyville Refinery	30.061322	-90.593528	St. John the Baptist
BASF Corp - Zachary Site	29.547603	-90.523231	East Baton Rouge
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188	Ascension
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497	St. Charles
ExxonMobil Chemical Co - Baton Rouge Polyolefins Plant	30.56215	-91.20387	East Baton Rouge
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381	St. Charles
NOVA Chemicals Olefins LLC - Geismar Ethylene Plant	30.230619	-91.052884	Ascension
Roehm America LLC - MMA Plant	29.9575	-90.265833	Jefferson
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955	St. Charles
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.409722	St. Charles
BASF Corp - North Geismar Site	30.20594	-90.99195	Ascension
Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339	Plaquemines
Shintech Louisiana LLC - Shintech Plaquemine Plant	30.273611	-91.173333	Iberville
Denka Performance Elastomer LLC	30.053928	-90.524792	St. John the Baptist

Formosa Plastics Corp Louisiana	30.501722	-91.185944	East Baton Rouge
DuPont Specialty Products USA LLC - Pontchartrain Site	30.05388	-90.52472	St. John the Baptist
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722	St. Charles
Syngenta Crop Protection LLC - St Gabriel Plant	30.246728	-91.103508	Iberville
Mosaic Fertilizer LLC - Faustina Plant	30.083914	-90.91345	St. James
Mosaic Fertilizer LLC - Uncle Sam Plant	30.037222	-90.8275	St. James
LBC Baton Rouge LLC - Sunshine Terminal	30.294444	-91.148333	Iberville
Occidental Chemical Corporation - Convent Facility	30.055885	-90.830594	St. James
TOTAL Petrochemicals & Refining USA Inc - Carville Polystyrene Plant	30.229786	-91.073631	Iberville
Targa Midstream Services LLC	29.237034	-89.384977	Plaquemines
EnLink LIG Liquids LLC - Plaquemine Gas Processing Plant	30.236389	-91.241389	Iberville
EnLink LIG Liquids LLC - Gibson Gas Processing Plant	29.643056	-90.961944	Terrebonne
NuStar Logistics LP - St James Terminal	30.030065	-90.843463	St. James
Enterprise Gas Processing LLC - Norco Fractionation Plant	30.015411	-90.402958	St. Charles
Lone Star NGL Refinery Services LLC - Geismar Fractionation Plant	30.218889	-91.035833	Ascension
INEOS Oxide - A Division of INEOS Americas LLC	30.313889	-91.240278	Iberville
Discovery Producer Services LLC - Discovery Paradis Fractionation Plant	29.858889	-90.453333	St. Charles
Plains Marketing LP - St James Terminal	30.004341	-90.848449	St. James
Methanex USA Services LLC - Geismar Methanol Plant	30.206667	-91.020833	Ascension
Dyno Nobel LA Ammonia LLC - Ammonia Production Facility	29.964789	-90.264625	Jefferson
Kinder Morgan Liquids Terminals LLC - Geismar Methanol Terminal	30.205389	-91.023792	Ascension
South LA Methanol LP - St James Methanol Plant	30.039917	-90.863819	St. James
YCI Methanol Plant	29.97481	-90.86775	St. James
IGP Methanol LLC - Gulf Coast Methanol Complex	29.625453	-89.926611	Plaquemines
KMe St James Holdings LLC - Methanol Terminal	29.990919	-90.841239	St. James
Kemira Chemicals Inc	29.964722	-90.264722	Jefferson
PHILLIPS 66 PIPELINE LLC	29.923889	-90.482498	St. Charles
CF INDUSTRIES	30.08328	-90.957665	Ascension

Appendix C: ASPECT Systems

The US EPA ASPECT system collects airborne infrared (IR) images and chemical screening data from a safe distance over the site (about 3,000 ft AGL). The system consists of an airborne high-speed Fourier Transform Infra-Red (FTIR) spectrometer coupled with a wide-area IR Line Scanner (IRLS). The ASPECT IR systems can detect chemical compounds in both the 8-to-12-micron (800 to 1200 cm^{-1}) and 3 to 5 micron (2000 to 3200 cm^{-1}) regions. List of chemicals and detection limits are listed in Table 1. The 8 to 12 micron region is typically known as the atmospheric window region since the band is reasonably void of water and carbon dioxide influence. Spectrally, this region is used to detect carbon - non-carbon bonded compounds. The 3 to 5 micron region is also free of water and carbon dioxide but typically does not have sufficient energy for use. This band does show use in high-energy environments such as fires. The carbon - hydrogen stretch is very common in this region.

An Imperx mapping camera (29 mega pixels; mapping focal plane array) is concurrently operated as part of all chemical collections. These images are often digitally processed in lower resolution, so they can be transmitted via satellite communication. All imagery is geo-rectified using both aircraft attitude correction (pitch, yaw, and roll) and GPS positional information. Imagery can be processed while in flight or approximately 600 frames per hour can be processed once the data are downloaded from the aircraft. The high-resolution images (>20 MB each) are pulled from the ASPECT after the sortie and are available later.

All aerial photographic images collected by the ASPECT system are ortho-rectified and geospatially validated by the scientific reach back team. In general, this consists of conducting geo-registration using a USGS Digital Elevation Model (DEM) which promotes superior pixel computation and lessens topographic distortion. The image is checked by the team (using a Google Earth base map) for proper location and rotation.

Airborne radiological measurements are conducted using three fully integrated multi-crystal sodium iodide (NaI) RSX4 gamma ray spectrometers. Each RSX4 spectrometer contains four 4"x2"x16" doped NaI crystals each having an independent photomultiplier/spectrometer assembly. One RSX unit is configured with an additional upward NaI crystal utilized to provide real-time cosmic ray correction. Count and energy data from each crystal and pack is combined using a self-calibrating signal processor to generate a virtual detector output. All radiological spectrometer "packs" are further combined using a signal console controlled by the on-board central computer in the aircraft. Altitude correction data is provided by a radar altimeter with internal GPS systems within the packs serving as a backup. It should be noted that no radiological measurements were conducted on this mission.

Data is processed using automated algorithms onboard the aircraft with preliminary results being sent using a satellite system to the ASPECT scientific reach back team for QA/QC analysis. Upon landing, preliminary data results are examined and validated by the

scientific reach back team.

Table 1. ASPECT Automated Compounds

This table contains ASPECT's library of automated compounds.

Detection limits are for each chemical is found in parenthesis in units of parts per million (ppm)

Acetic Acid (2.0)	Cumene (23.1)	Isoprene (6.5)	Phosphine (8.3)
Acetone (5.6)	Diborane (5.0)	Isopropanol (8.5)	Phosphorus Oxychloride (2.0)
Acrolein (8.8)	1,1-Dichloroethene (3.7)	Isopropyl Acetate (0.7)	Propyl Acetate (0.7)
Acrylonitrile (12.5)	Dichloromethane (6.0)	MAPP (3.7)	Propylene (3.7)
Acrylic Acid (3.3)	Dichlorodifluoromethane (0.7)	Methyl Acetate (1.0)	Propylene Oxide (6.8)
Allyl Alcohol (5.3)	1,1-Difluoroethane (0.8)	Methyl Acrylate (1.0)	Silicon Tetrafluoride (0.2)
Ammonia (2.0)	Difluoromethane (0.8)	Methyl Ethyl Ketone (7.5)	Sulfur Dioxide (15)
Arsine (18.7)	Ethanol (6.3)	Methanol (5.4)	Sulfur Hexafluoride (0.07)
Bis-Chloroethyl Ether (1.7)	Ethyl Acetate (0.8)	Methylbromide (60)	Sulfur Mustard (6.0)
Boron Tribromide (0.2)	Ethyl Acrylate (0.8)	Methylene Chloride (1.1)	Sulfuryl Fluoride (1.5)
Boron Trifluoride (5.6)	Ethyl Formate (1.0)	Methyl Methacrylate (3.0)	Tetrachloroethylene (10)
1,3-Butadiene (5.0)	Ethylene (5.0)	MTEB (3.8)	1,1,1-Trichloroethane (1.9)
1-Butene (12.0)	Formic Acid (5.0)	Naphthalene (3.8)	Trichloroethylene (2.7)
2-Butene (18.8)	Freon 134a (0.8)	n-Butyl Acetate (3.8)	Trichloromethane (0.7)
Carbon Tetrachloride (0.2)	GA (Tabun) (0.7)	n-Butyl Alcohol (7.9)	Triethylamine (6.2)
Carbonyl Fluoride (0.8)	GB (Sarin) (0.5)	Nitric Acid (5.0)	Triethylphosphate (0.3)
Carbon Tetrafluoride (0.1)	Germane (1.5)	Nitrogen Mustard (2.5)	Trimethylamine (9.3)
Chlorodifluoromethane (0.6)	Hexafluoroacetone (0.4)	Nitrogen Trifluoride (0.7)	Trimethyl Phosphite (0.4)
Chloromethane (12)	Isobutylene (15)	Phosgene (0.5)	Vinyl Acetate (0.6)

Message

From: Assunto, Carmen [Assunto.Carmen@epa.gov]
Sent: 9/10/2021 11:52:21 AM
To: Patel, Anish [patel.anish@epa.gov]
CC: Loesel, Matthew [loesel.matthew@epa.gov]; Roff, Nicholas [Roff.Nicholas@epa.gov]
Subject: RE: ASPECT Photos for Hurricane Ida Storymap

Approved. Carmen

From: Patel, Anish <patel.anish@epa.gov>
Sent: Thursday, September 9, 2021 10:05 PM
To: Assunto, Carmen <Assunto.Carmen@epa.gov>
Cc: Loesel, Matthew <loesel.matthew@epa.gov>; Roff, Nicholas <Roff.Nicholas@epa.gov>
Subject: ASPECT Photos for Hurricane Ida Storymap

Ms. Carmen,

In addition to the photos you have already reviewed, we have added photos from ASPECT flight conducted on 9/8/21 to the storymap (link <https://storymaps.arcgis.com/stories/1325210b89b0418d9fabf9ec4a1a63f1>). Please review and approve to be included in the PUBLIC storymap.

Let me know if you have any questions.

Thanks in advance,
Anish Patel
Federal On Scene Coordinator (FOSC)
U.S. Environmental Protection Agency – Region 6
1201 Elm Street (SEDEC)
Dallas, TX 75270
Office: (214) 665-2288
Mobile: (469) 510-9721

Message

From: Roff, Nicholas [Roff.Nicholas@epa.gov]
Sent: 9/9/2021 8:20:01 PM
To: Assunto, Carmen [Assunto.Carmen@epa.gov]
CC: HQ EOC Public Information Officer [HQ_PIO@epa.gov]; Loesel, Matthew [loesel.matthew@epa.gov]; Patel, Anish [patel.anish@epa.gov]
Subject: Please Review - Hurricane Ida ASPECT Map for September 8th
Attachments: ASPECT MAP - Hurricane Ida_20210909_rev1.pdf

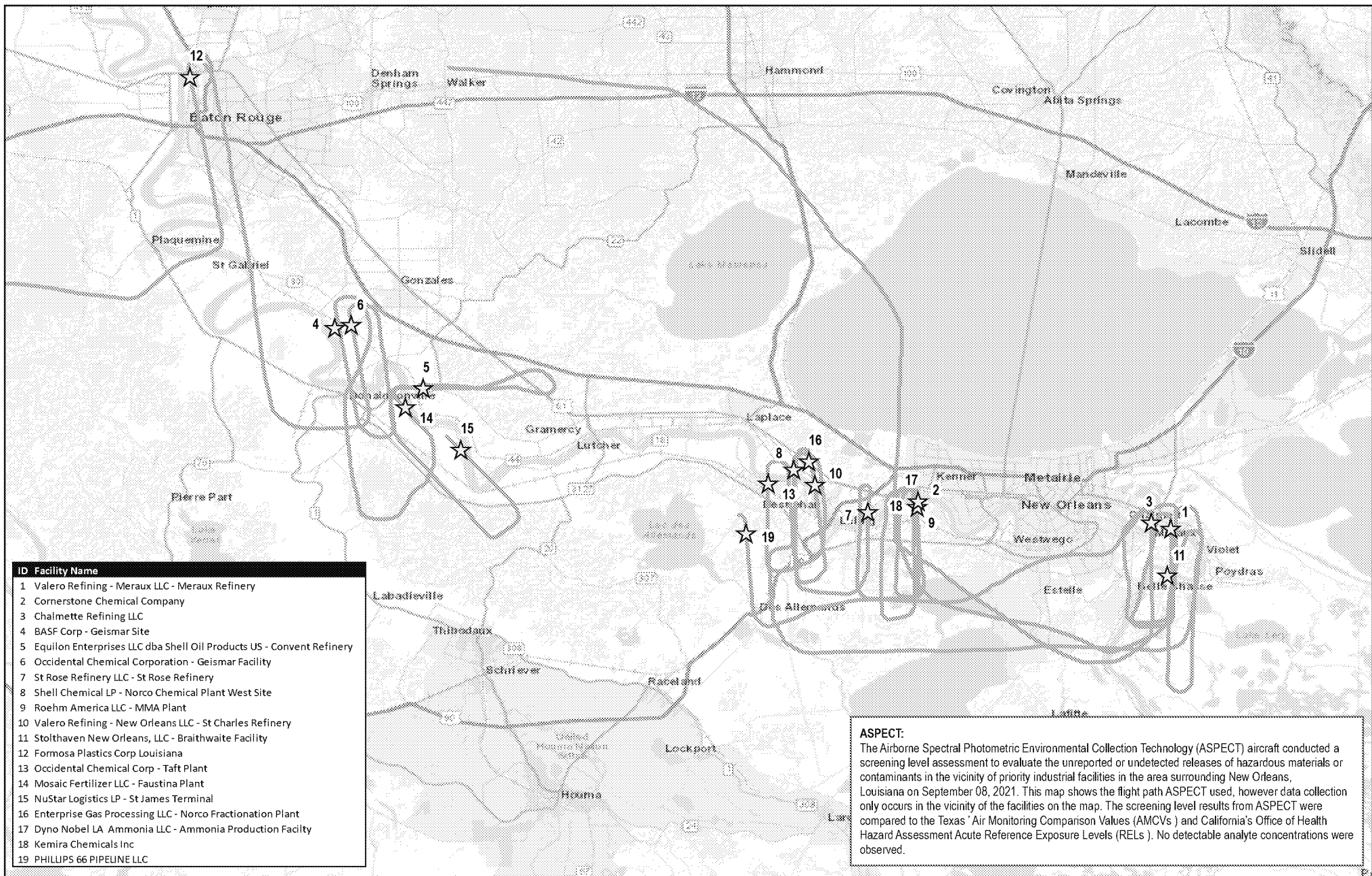
Carmen,

Please see attached pdf of the revised map for approval.

Thank you in advance,

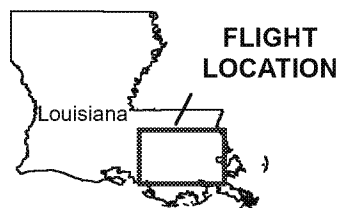


Nick Roff
Federal On-Scene Coordinator
U.S. Environmental Protection Agency – Region 6
1201 Elm Street Suite 500
Dallas, Texas 75270
(214) 665-3157 (office)
(469) 578-5172 (cell)
roff.nicholas@epa.gov



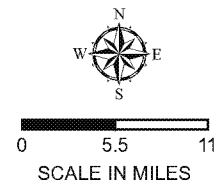
Legend

- ★ FACILITIES OF INTEREST
- ~ ASPECT FLIGHT PATH



ASPECT MAP HURRICANE IDA RESPONSE LOUISIANA

FLIGHT DATE
9/8/2021



**For Official Use Only
Printed via Web**



Printed: 3:13:05 PM 9/9/2021

Message

From: Taylor, Jillianne [Taylor.Jillianne@epa.gov]
Sent: 9/13/2021 1:49:24 PM
To: Loesel, Matthew [loesel.matthew@epa.gov]
Subject: RE: ASPECT Report for September 11, 2021

Thank you, I'll get on these now!

From: Loesel, Matthew <loesel.matthew@epa.gov>
Sent: Monday, September 13, 2021 8:48 AM
To: Taylor, Jillianne <Taylor.Jillianne@epa.gov>
Subject: FW: ASPECT Report for September 11, 2021

From: I <subracom@aol.com>
Sent: Monday, September 13, 2021 8:43 AM
To: Loesel, Matthew <loesel.matthew@epa.gov>
Subject: Re: ASPECT Report for September 11, 2021

Figure 1 title, LDEQ Oil Survey Area September 8, 2021.

The date should be September 11, 2021 or was September 8 the date DEQ issued the document?

Table 2, Ground Weather for NO Flight 13, September 11, 2021 is actually the first table.

Thus all Table numbers need to be changed.

Under FTIR Data Results
List of chemicals are provided in Appendix B, Table 1

Table 1 follows Appendix C: ASPECT Systems. It is not under Appendix B.

There is also no Appendix letter for Table 1.

Wilma Subra

-----Original Message-----

From: Loesel, Matthew <loesel.matthew@epa.gov>
To: SubraCom@aol.com <SubraCom@aol.com>
Sent: Mon, Sep 13, 2021 7:16 am
Subject: ASPECT Report for September 11, 2021

Ms. Subra –

Please find attached a copy of the Draft Report from the ASPECT flight on September 11 in response to Hurricane Ida for review and comments. This flight was more of a wide area surveillance looking for spills rather than facilities. The report for yesterday should be available later today as well. Thank you for your attention to this.

Matthew Loesel

U.S. EPA – Federal On-Scene Coordinator

1201 Elm Street
Suite 500 (6SED-EC)
Dallas, Texas 75270
(214) 738 0674 (mobile)
(214) 665 8544 (office)
loesel.matthew@epa.gov

Message

From: I [subracom@aol.com]
Sent: 9/2/2021 10:20:23 PM
To: Loesel, Matthew [loesel.matthew@epa.gov]
Subject: Re: EPA ASPECT Flight Data

I am available.

Wilma

-----Original Message-----

From: Loesel, Matthew <loesel.matthew@epa.gov>
To: SubraCom@aol.com <SubraCom@aol.com>
Sent: Thu, Sep 2, 2021 5:16 pm
Subject: EPA ASPECT Flight Data

Ms. Subra –

My name is Matt Loesel, an Federal OSC in Region 6. Region 6 began flying ASPECT today in support of the State of Louisiana's Hurricane Ida response. I wanted to touch base with you to make sure you are available again to review the ASPECT reports as we receive them as you did for us during our Winter Storm Response. Thank you for your support in the past. Please let me know of your availability and any other questions you may have.

Matthew Loesel
U.S. EPA – Federal On-Scene Coordinator
1201 Elm Street
Suite 500 (6SED-EC)
Dallas, Texas 75270
(214) 738 0674 (mobile)
(214) 665 8544 (office)
loesel.matthew@epa.gov

Airborne Spectral Photometric Environmental Collection Technology

ASPECT Air Quality Survey for Hurricane Ida Baton Rouge, LA September 8, 2021



ASPECT Mission Supporting:

Eric Delgado
On-Scene Coordinator
Delgado.Eric@epa.gov

Initial Mission Request

Brian Fontenot
Louisiana Department of Environmental Quality

ASPECT TEAM

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Table of Contents

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Acronyms and Abbreviations

Alt	Altitude (in feet)
AGL	Above Ground Level
cm	centimeter
CDT	Central Daylight Time
DEM	Digital Elevation Model
ESF-10	Emergency Support Function #10 – Oil and Hazardous Materials Response
FEMA	Federal Emergency Management Agency
FTIR	Fourier Transform Infrared Spectrometer
FTP	File Transfer Protocol
igm	Spectral data format based on grams format
IR	Infrared
IRLS	Infrared Line Scanner
jpg	JPEG image format
kts	knots
mph	miles per hour
m/s	meters per second
MSIC	Digital photography file from the Imperx mapping camera
MSL	Mean Sea Level Altitude (in feet)
PAN	peroxyacetyl nitrate
Ppm	parts per million
RMP	Risk Management Plan
UTC	Universal Time Coordinated

Executive Summary

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 29 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2nd, 2021, the State of Louisiana requested ESF-10 assistance through FEMA and Region 6 asked for the ASPECT plane to be deployed in support of the response to Hurricane Ida. The state wanted assistance monitoring facility emissions in the industrial area between Baton Rouge and New Orleans, where flaring is resulting in the visible emission of black smoke.

ASPECT was tasked to perform remote chemical sensing over target properties to screen for airborne chemicals and take high-resolution photos to provide situational awareness. Potential areas identified for monitoring included: East Baton Rouge, Ascension, Iberville, St. James, St. John, St. Charles, Jefferson, and Orleans. The system conducted one flight mission on 2 September 2021 including air monitoring survey collections over the target area with favorable weather conditions for all passes. Although two black plumes were visible over one of the sites, no major emissions were detected with the FTIR.

A continuation of the overall Baton Rouge facility survey was conducted on September 3. Two data collection flights were conducted which bracketed a Presidential temporary flight restriction not allowing any flight activity. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Flight 5 and 6 were conducted as part of survey operations conducted on September 4. A total of 17 facilities were surveyed. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm in addition to ozone and peroxyacetyl nitrate. Analysis of IR imagery indicated that some facilities are showing hot process units.

ASPECT conducted two data collection missions on September 5 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 32 active data collection passes were made covering 21 facilities. Imagery collected within impact areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

Two data collection missions were conducted by ASPECT on September 7 with the primary focus to collect additional data over targets surveyed on September 5 (St. Bernard, Terrebonne, St. Charles, and St. James areas). A total of 16 data collection

passes (2 test and 14 active) were made over about half of the target list. Weather conditions complicated the mission with numerous convective cells and low clouds in the area. No compounds were detected on either flight.

ASPECT conducted two missions on September 8 with the primary objective to complete the mission of collecting additional data at facilities assigned on September 7. Weather conditions over the target areas within St. Bernard, Terrebonne, St. Charles, and St. James parishes was marginal due to clouds and convective activity. A total of 21 data collection passes (2 test and 19 active) were required to complete the mission with no detections observed.

ASPECT Air Quality Survey

Hurricane IDA

Baton Rouge, LA

September 8, 2021

Background and Operational Overview

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 29 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2, ASPECT was tasked to conduct a wide area air quality screening level assessment of areas populated with Risk Management Plan (RMP) sites and petrochemical facilities using the ASPECT system for detections of any airborne contaminants from ASPECT's 76 chemical detection library in the areas affected by Ida. The Region wanted to know if any detections were found, the location of the detection, and the concentration detected. Sites including Marathon Petroleum Company, Shell Norco Facility, and Phillips 66 pipeline site were surveyed. There were no chemical detections at the sites surveyed. Extremely slow satellite transmission speeds (possibly due to high bandwidth use by other first responders) resulted in long delays in data collection. Some chemical photos were pulled down during flight, with the majority needing to be pulled down with a more high-speed internet connection on the ground.

On September 3 ASPECT was tasked with a continuation of the general Baton Rouge area survey and conducted two flights. 8 locations in the Baton Rouge area were surveyed as part of two flights. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Two data collection flights were conducted on September 4 focusing on facilities south of Baton Rouge. A total of 29 active data collection passes were made covering 17 facilities. Analysis of IR imagery indicated that some facilities are showing hot process units. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm.

ASPECT conducted two data collection missions on September 5 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 32 active data collection passes were made covering 21 facilities. Imagery collected within impact

areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

Due to poor weather, ASPECT did not conduct any flight activities on September 6. ASPECT was tasked with two missions on 7 September consisting largely of revisiting facilities surveyed on September 5 for the purpose of collecting additional data.

ASPECT was tasked with two missions on September 8 for the purpose of collecting additional data for those facilities and sites surveyed on September 5. This report details the significant findings of these two survey missions.

Table 1. Sites Covered on September 8, 2021

Valero Refining - Meraux LLC - Meraux Refinery	29.930222	-89.944917	St. Bernard
Cornerstone Chemical Company	29.964722	-90.264722	Jefferson
Chalmette Refining LLC	29.937903	-89.969903	St. Bernard
BASF Corp - Geismar Site	30.18425	-91.002778	Ascension
Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery	30.107684	-90.890796	St. James
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188	Ascension
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497	St. Charles
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381	St. Charles
Roehm America LLC - MMA Plant	29.9575	-90.265833	Jefferson
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955	St. Charles
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.409722	St. Charles
Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339	Plaquemines
Formosa Plastics Corp Louisiana	30.501722	-91.185944	East Baton Rouge
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722	St. Charles
Mosaic Fertilizer LLC - Faustina Plant	30.083914	-90.91345	St. James
NuStar Logistics LP - St James Terminal	30.030065	-90.843463	St. James
Dyno Nobel LA Ammonia LLC - Ammonia Production Facility	29.964789	-90.264625	Jefferson
Kemira Chemicals Inc	29.964722	-90.264722	Jefferson
PHILLIPS 66 PIPELINE LLC	29.923889	-90.482498	St. Charles

General Mission Objectives

Once granted access to fly over the sites, the following general mission objectives were employed in conducting data collection with ASPECT:

1. To capture an overall, situational awareness of the incident using aerial photography with:
 - Oblique camera—photos taken by hand from the view/position of the co-pilot, and
 - MSIC photos—advanced camera mounted underneath the plane for a top-down view of the designated sites.

2. To qualitatively locate and characterize any the visible and non-visible components of a plume, as well as any areas on fire:
 - Using the Infrared Line Scanner (IRLS)
3. To screen for the presence and location of specific chemicals within ASPECT's automated chemical detection library:
 - Using the Fourier Transform Infrared (FTIR) Spectrometer

Flight Conditions and Status

Weather and Site Conditions

Prior to each flight, an updated status of the current and forecasted weather, site conditions and any potential flight obstacles including radio towers impacting safety is assessed by the crew. A summary of the ground weather conditions during the missions can be found in Tables 2 and 3.

**Table 2. Ground Weather for Baton Rouge, LA, Flight 11
September 8, 2021**

Time	753	853	953	1053
Wind direction	0 degrees N	0 degrees N	22.5 degrees NNE	0 degrees N
Wind speed	0.4 m/s (1.0 mph)	0.4 m/s (1.0 mph)	2.2 m/s (5.0 mph)	0.4 m/s (1.0 mph)
Temperature	22.8 C	23.9 C	26.1 C	27.8 C
Relative humidity	100	96	88	77
Dew point	22.8 C	23.3 C	23.9 C	23.3 C
Pressure	1011.2 mb	1011.6 mb	1012.6 mb	1012.3 mb
Ceiling	Clear	Clear	Clear	Few 1700 Ft

**Table 3. Ground Weather for Baton Rouge, LA, Flight 12
September 8, 2021**

Time	1253	1353	1453	1553	1653
Wind direction	0 degrees	0 degrees	292.5 degrees WNW	0 degrees	0 degrees N
Wind speed	1.3 m/s (3.0 mph)	1.3 m/s (3.0 mph)	2.7 m/s (6.0 mph)	2.7 m/s (6.0 mph)	3.1 m/s (7.0 mph)
Temperature	30.6 C	31.1 C	30.6 C	30.6 C	30.0 C
Relative humidity	63	66	65	65	67
Dew point	22.8 C	23.9 C	23.3 C	23.3 C	23.3 C
Pressure	1011.2 mb	1010.9 mb	1009.9 mb	1009.5 mb	1009.5 mb
Ceiling	Few 2800 Ft	Scattered 4100 Ft	Broken 3500 Ft	Scattered 3600 Ft	Scattered 3100 Ft

Data Results

The following data is provided as a summary analysis. All data products are available for the Region to access on a shared FTP site. For a complete list of available products, see Appendix A. The data collected during these missions included a flight path summary, IRLS images, FTIR chemical identification and quantification, high resolution MSIC photos, and oblique photos.

Flight Paths

Wide, slow turns are required to be made in between runs to keep the instruments stable. The blue lines indicate the flight path while the green lines indicate the specific sections of the flight where chemical data was collected and processed. On Flight 11 and 12, the St. Bernard, Terrebonne, St. Charles, and St. James areas were surveyed, and the flight paths are shown in Figures 1 and 2.

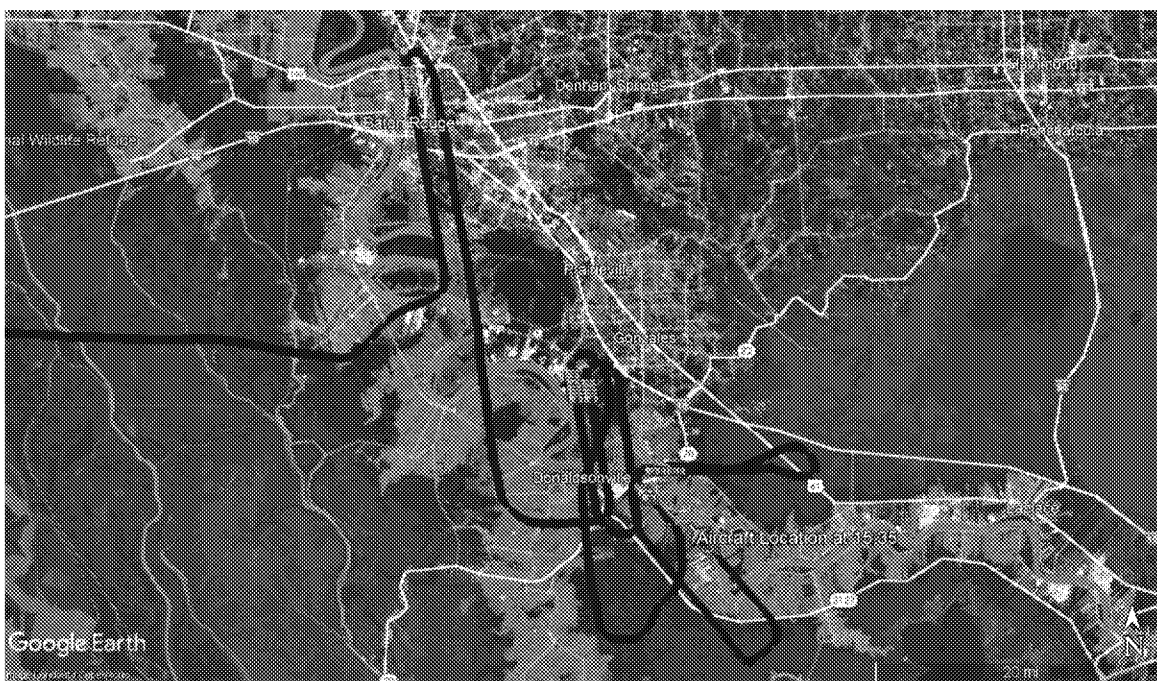


Figure 1. Data Collection Flight Path,
St. Bernard, Terrebonne, St. Charles, and St. James, Flight 11,
September 8, 2021

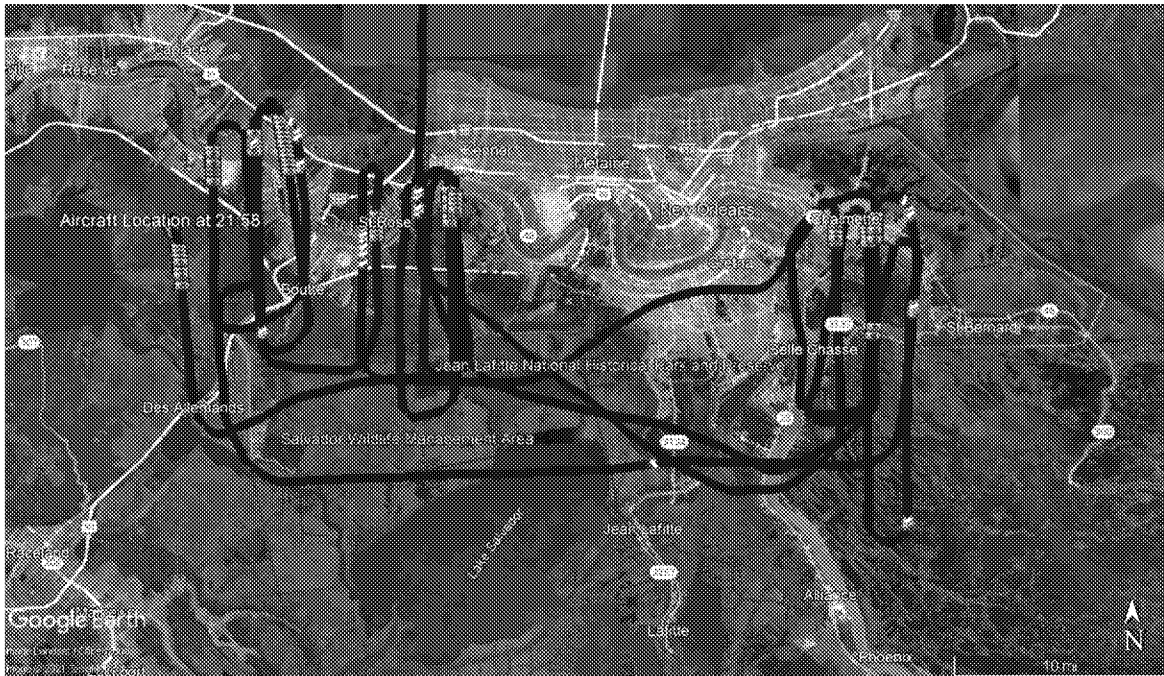


Figure 2. Data Collection Flight Path, St. Bernard, Terrebonne, St. Charles, and St. James, Flight 12, September 8, 2021

Line Scanner Data Results

A total of 21 data collection runs (2 tests and 19 active) were made over the target facilities and an infrared line scanner image was generated for each collection run. Figure 3 shows a 3-band infrared image collected over the Shell Convent refinery. Analysis of the image shows elevated piping and hot units in the main process section of the facility. No discharges can be seen leaving the facility. Figure 4 shows a similar image collected over the Valero Refining Meraux Refinery. Hot flares in the lower portion of the image in addition to some hot process piping is evident.



Figure 3. Three band IR image, Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery, Flight 11, September 8, 2021



Figure 4. Three band IR image, Valero Refining - Meraux LLC - Meraux Refinery, Flight 12, September 8, 2021

FTIR Data Results

FTIR spectral data at a resolution of 16 wavenumbers was collected for each run. ASPECT uses an automated detection algorithm to permit compounds to be automatically analyzed while the aircraft is in flight. Seventy-six chemical compounds are included in the airborne algorithm library (the list is provided in Appendix B, Table 1). In addition, collected data was also manually quality checked against a collection of published library spectra for each chemical detected.

ASPECT did not detect any programmed compounds (those found in Appendix B, Table 1) as part of the mission over the target areas on the two flights conducted on September 8. Details of the monitoring results can be found in Tables 4 and 5.

**Table 4. Chemical Results Summary
St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 11**

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-08	13:33:30	Test	Test
2		14:17:52	ND	ND
3		14:40:19	ND	ND
4		14:52:31	ND	ND
5		15:09:37	ND	ND
6		15:21:28	ND	ND
7		15:34:50	ND	ND

**Table 5. Chemical Results Summary
St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 12**

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-08	18:34:18	Test	Test
2		19:01:56	ND	ND
3		19:15:34	ND	ND
4		19:44:16	ND	ND
5		19:55:29	ND	ND
6		20:07:03	ND	ND
7		20:19:49	ND	ND
8		20:32:08	ND	ND
9		20:42:11	ND	ND
10		20:54:08	ND	ND
11		21:13:18	ND	ND
12		21:24:24	ND	ND
13		21:35:33	ND	ND
14		21:56:30	ND	ND

Aerial Photography Results

A full set of high-resolution aerial digital photography were collected as part of each data collection pass. As with the missions on September 7, flight conditions were complicated by low ceiling and convective activity. An aerial image of the St. Rose refinery is given in Figure 5. No significant damage or activity is evident in the image. An oblique image of the Valero Meraux Refinery is shown in Figure 6. As indicated in IR images of the same facility, two flares can be observed indicating some activity within the facility.



Figure 5. MSIC image of the St Rose Refinery LLC - St Rose, Flight 12, September 8, 2021



Figure 6. Oblique photo of the Valero Meraux Refinery, Flight 12, September 8, 2021

Conclusion

ASPECT conducted two missions on September 8, 2021 with the primary objective to complete the mission of collecting additional data at facilities assigned on 7 September. Weather conditions over the target areas within St. Bernard, Terrebonne, St. Charles, and St. James parishes was marginal due to clouds and convective activity. A total of 21 data collection passes (2 test and 19 active) were required to complete the mission with no detections observed.

Appendix A: File Names of Data Collected During Flight

St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 11, September 8, 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	13:33:30	3592	152	20210908133336255.jpg 20210908133342604.jpg 20210908133348968.jpg 20210908133350778.jpg	20210908_133333_A.igm	2021_09_08_13_33_34_R_01 TA=22.8;TB=43.6;Gain=3	
2	14:17:52	2868	106	20210908141759050.jpg 20210908141805409.jpg 20210908141811758.jpg 20210908141818122.jpg 20210908141824471.jpg 20210908141830826.jpg 20210908141837175.jpg 20210908141843533.jpg	20210908_141755_A.igm 20210908_141835_A.igm	2021_09_08_14_17_57_R_02 TA=18.0;TB=38.0;Gain=3	
3	14:40:19	2885	107	20210908144025438.jpg 20210908144031788.jpg 20210908144038152.jpg 20210908144044501.jpg 20210908144050860.jpg 20210908144057209.jpg	20210908_144022_A.igm	2021_09_08_14_40_24_R_03 TA=20.9;TB=41.0;Gain=3	
4	14:52:31	2887	107	20210908145237194.jpg 20210908145244464.jpg 20210908145250811.jpg 20210908145257176.jpg 20210908145303525.jpg 20210908145309874.jpg 20210908145316233.jpg 20210908145322582.jpg 20210908145328947.jpg	20210908_145235_A.igm 20210908_145314_A.igm	2021_09_08_14_52_36_R_04 TA=22.7;TB=42.6;Gain=3	
5	15:09:37	2946	103	20210908150943111.jpg 20210908150949454.jpg 20210908150955818.jpg 20210908151002170.jpg 20210908151008519.jpg 20210908151014883.jpg	20210908_150939_A.igm	2021_09_08_15_09_41_R_05 TA=23.9;TB=43.9;Gain=3	
6	15:21:28	2875	106	20210908152133983.jpg 20210908152140335.jpg 20210908152146684.jpg 20210908152153041.jpg 20210908152159406.jpg 20210908152205749.jpg 20210908152212114.jpg 20210908152219367.jpg 20210908152225732.jpg	20210908_152130_A.igm 20210908_152210_A.igm	2021_09_08_15_21_32_R_06 TA=23.2;TB=43.3;Gain=3	
7	15:34:50	2914	106	20210908153456558.jpg 20210908153502907.jpg 20210908153509271.jpg 20210908153515620.jpg 20210908153521979.jpg	20210908_153453_A.igm	2021_09_08_15_34_55_R_07 TA=22.4;TB=42.5;Gain=3	

St. Bernard, Terrebonne, St. Charles, and St. James Areas, Flight 12, September 8, 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	18:34:18	2559	130	20210908183424447.jpg 20210908183429907.jpg 20210908183435351.jpg	20210908_183421_A.igm	2021_09_08_18_34_22_R_01 TA=26.6;TB=46.8;Gain=3	
2	19:01:56	2560	107	20210908190202275.jpg 20210908190208624.jpg 20210908190214974.jpg 20210908190221338.jpg 20210908190227688.jpg	20210908_190200_A.igm	2021_09_08_19_02_00_R_02 TA=22.9;TB=43.0;Gain=3	
3	19:15:34	2545	100	20210908191540278.jpg 20210908191546643.jpg 20210908191552992.jpg	20210908_191537_A.igm	2021_09_08_19_15_38_R_03 TA=24.6;TB=44.5;Gain=3	
4	19:44:16	2545	106	20210908194422556.jpg 20210908194428908.jpg 20210908194436178.jpg 20210908194442527.jpg 20210908194448892.jpg	20210908_194420_A.igm	2021_09_08_19_44_21_R_04 TA=22.9;TB=42.8;Gain=3	
5	19:55:29	2538	105	20210908195535298.jpg 20210908195541663.jpg 20210908195548012.jpg 20210908195554377.jpg 20210908195600726.jpg 20210908195607080.jpg 20210908195613430.jpg 20210908195619799.jpg	20210908_195532_A.igm 20210908_195611_A.igm	2021_09_08_19_55_33_R_05 TA=26.8;TB=46.6;Gain=3	
6	20:07:03	2531	107	20210908200708943.jpg 20210908200715292.jpg 20210908200721641.jpg 20210908200728911.jpg 20210908200735260.jpg 20210908200741625.jpg 20210908200747974.jpg 20210908200754339.jpg 20210908200800688.jpg 20210908200807942.jpg 20210908200814307.jpg 20210908200820656.jpg	20210908_200707_A.igm 20210908_200745_A.igm 20210908_200759_A.igm	2021_09_08_20_07_07_R_06 TA=24.4;TB=44.1;Gain=3 2021_09_08_20_08_00_R_07 TA=24.3;TB=44.3;Gain=3	
7	20:19:49	2523	104	20210908201956101.jpg 20210908202002466.jpg 20210908202008815.jpg 20210908202015180.jpg 20210908202021529.jpg 20210908202027878.jpg	20210908_201953_A.igm	2021_09_08_20_19_54_R_08 TA=27.6;TB=47.6;Gain=3	
8	20:32:08	2533	108	20210908203214224.jpg 20210908203220573.jpg 20210908203226938.jpg 20210908203233287.jpg	20210908_203211_A.igm	2021_09_08_20_32_13_R_09 TA=26.9;TB=46.9;Gain=3	
9	20:42:11	2545	104	20210908204217063.jpg 20210908204223428.jpg 20210908204229782.jpg 20210908204237036.jpg 20210908204243396.jpg 20210908204244301.jpg	20210908_204215_A.igm	2021_09_08_20_42_16_R_10 TA=27.2;TB=47.3;Gain=3	

10	20:54:08	2547	106	20210908205414302.jpg 20210908205421558.jpg 20210908205427923.jpg 20210908205434282.jpg 20210908205440631.jpg 20210908205446980.jpg 20210908205453345.jpg 20210908205459694.jpg	20210908_205412_A.igm 20210908_205452_A.igm	2021_09_08_20_54_13_R_11 TA=27.8;TB=47.8;Gain=3	
11	21:13:18	2550	104	20210908211324610.jpg 20210908211330959.jpg 20210908211337309.jpg 20210908211343673.jpg 20210908211350023.jpg	20210908_211322_A.igm	2021_09_08_21_13_23_R_12 TA=24.1;TB=44.2;Gain=3	
12	21:24:24	2539	103	20210908212430088.jpg 20210908212436447.jpg 20210908212442796.jpg 20210908212449155.jpg	20210908_212427_A.igm	2021_09_08_21_24_29_R_13 TA=23.8;TB=43.9;Gain=3	
13	21:35:33	2566	104	20210908213540115.jpg 20210908213546464.jpg 20210908213552826.jpg 20210908213559175.jpg 20210908213605534.jpg 20210908213611899.jpg	20210908_213536_A.igm	2021_09_08_21_35_38_R_14 TA=23.0;TB=42.8;Gain=3	
14	21:56:30	2558	105	20210908215635735.jpg 20210908215642084.jpg 20210908215649354.jpg 20210908215655701.jpg 20210908215702065.jpg 20210908215708415.jpg 20210908215714779.jpg 20210908215721129.jpg 20210908215727478.jpg	20210908_215633_A.igm 20210908_215712_A.igm	2021_09_08_21_56_35_R_15 TA=24.2;TB=44.1;Gain=3	

**Appendix B: Priority Sites Provided by EPA Region 6 & Louisiana Department of
Environmental Quality**

Facility_Name	Latitude	Longitude	Parish
Deltech LLC - Baton Rouge Facility	30.552892	-91.200536	East Baton Rouge
ExxonMobil Chemical Co - Baton Rouge Plastics Plant	30.551419	-91.175611	East Baton Rouge
ExxonMobil Baton Rouge Chemical Plant	30.484336	-91.169644	East Baton Rouge
Marathon Petroleum Co LP	30.068394	-90.596364	St. John the Baptist
Westlake Vinyls Co LP	30.209167	-91.017222	Ascension
Valero Refining - Meraux LLC - Meraux Refinery	29.930222	-89.944917	St. Bernard
Cornerstone Chemical Company	29.964722	-90.264722	Jefferson
Chalmette Refining LLC	29.937903	-89.969903	St. Bernard
ExxonMobil Chemical Company - Baton Rouge Chemicals North Plant	30.50465	-91.173219	East Baton Rouge
Equilon Enterprises LLC - Norco Refinery	29.995372	-90.410167	St. Charles
The Dow Chemical Company - Louisiana Operations	30.313927	-91.240586	Iberville
Rubicon LLC - Geismar Facility	30.20139	-91.01222	Ascension
BASF Corp - Geismar Site	30.18425	-91.002778	Ascension
Union Carbide Corp - St. Charles Plant	29.982289	-90.455622	St. Charles
Phillips 66 Co - Alliance Refinery	29.68406	-89.98145	Plaquemines
Axiall LLC - Plaquemine Facility	30.267167	-91.184258	Iberville
ExxonMobil Fuels & Lubricants Co - Baton Rouge Refinery	30.484392	-91.169444	East Baton Rouge
Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery	30.107684	-90.890796	St. James
Marathon Petroleum Company LP - Louisiana Refining Division - Garyville Refinery	30.061322	-90.593528	St. John the Baptist
BASF Corp - Zachary Site	29.547603	-90.523231	East Baton Rouge
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188	Ascension
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497	St. Charles
ExxonMobil Chemical Co - Baton Rouge Polyolefins Plant	30.56215	-91.20387	East Baton Rouge
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381	St. Charles
NOVA Chemicals Olefins LLC - Geismar Ethylene Plant	30.230619	-91.052884	Ascension
Roehm America LLC - MMA Plant	29.9575	-90.265833	Jefferson
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955	St. Charles
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.409722	St. Charles
BASF Corp - North Geismar Site	30.20594	-90.99195	Ascension
Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339	Plaquemines
Shintech Louisiana LLC - Shintech Plaquemine Plant	30.273611	-91.173333	Iberville
Denka Performance Elastomer LLC	30.053928	-90.524792	St. John the Baptist

Formosa Plastics Corp Louisiana	30.501722	-91.185944	East Baton Rouge
DuPont Specialty Products USA LLC - Pontchartrain Site	30.05388	-90.52472	St. John the Baptist
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722	St. Charles
Syngenta Crop Protection LLC - St Gabriel Plant	30.246728	-91.103508	Iberville
Mosaic Fertilizer LLC - Faustina Plant	30.083914	-90.91345	St. James
Mosaic Fertilizer LLC - Uncle Sam Plant	30.037222	-90.8275	St. James
LBC Baton Rouge LLC - Sunshine Terminal	30.294444	-91.148333	Iberville
Occidental Chemical Corporation - Convent Facility	30.055885	-90.830594	St. James
TOTAL Petrochemicals & Refining USA Inc - Carville Polystyrene Plant	30.229786	-91.073631	Iberville
Targa Midstream Services LLC	29.237034	-89.384977	Plaquemines
EnLink LIG Liquids LLC - Plaquemine Gas Processing Plant	30.236389	-91.241389	Iberville
EnLink LIG Liquids LLC - Gibson Gas Processing Plant	29.643056	-90.961944	Terrebonne
NuStar Logistics LP - St James Terminal	30.030065	-90.843463	St. James
Enterprise Gas Processing LLC - Norco Fractionation Plant	30.015411	-90.402958	St. Charles
Lone Star NGL Refinery Services LLC - Geismar Fractionation Plant	30.218889	-91.035833	Ascension
INEOS Oxide - A Division of INEOS Americas LLC	30.313889	-91.240278	Iberville
Discovery Producer Services LLC - Discovery Paradis Fractionation Plant	29.858889	-90.453333	St. Charles
Plains Marketing LP - St James Terminal	30.004341	-90.848449	St. James
Methanex USA Services LLC - Geismar Methanol Plant	30.206667	-91.020833	Ascension
Dyno Nobel LA Ammonia LLC - Ammonia Production Facility	29.964789	-90.264625	Jefferson
Kinder Morgan Liquids Terminals LLC - Geismar Methanol Terminal	30.205389	-91.023792	Ascension
South LA Methanol LP - St James Methanol Plant	30.039917	-90.863819	St. James
YCI Methanol Plant	29.97481	-90.86775	St. James
IGP Methanol LLC - Gulf Coast Methanol Complex	29.625453	-89.926611	Plaquemines
KMe St James Holdings LLC - Methanol Terminal	29.990919	-90.841239	St. James
Kemira Chemicals Inc	29.964722	-90.264722	Jefferson
PHILLIPS 66 PIPELINE LLC	29.923889	-90.482498	St. Charles
CF INDUSTRIES	30.08328	-90.957665	Ascension

Appendix C: ASPECT Systems

The US EPA ASPECT system collects airborne infrared (IR) images and chemical screening data from a safe distance over the site (about 3,000 ft AGL). The system consists of an airborne high-speed Fourier Transform Infra-Red (FTIR) spectrometer coupled with a wide-area IR Line Scanner (IRLS). The ASPECT IR systems can detect chemical compounds in both the 8-to-12-micron (800 to 1200 cm^{-1}) and 3 to 5 micron (2000 to 3200 cm^{-1}) regions. List of chemicals and detection limits are listed in Table 1. The 8 to 12 micron region is typically known as the atmospheric window region since the band is reasonably void of water and carbon dioxide influence. Spectrally, this region is used to detect carbon - non-carbon bonded compounds. The 3 to 5 micron region is also free of water and carbon dioxide but typically does not have sufficient energy for use. This band does show use in high-energy environments such as fires. The carbon - hydrogen stretch is very common in this region.

An Imperx mapping camera (29 mega pixels; mapping focal plane array) is concurrently operated as part of all chemical collections. These images are often digitally processed in lower resolution, so they can be transmitted via satellite communication. All imagery is geo-rectified using both aircraft attitude correction (pitch, yaw, and roll) and GPS positional information. Imagery can be processed while in flight or approximately 600 frames per hour can be processed once the data are downloaded from the aircraft. The high-resolution images (>20 MB each) are pulled from the ASPECT after the sortie and are available later.

All aerial photographic images collected by the ASPECT system are ortho-rectified and geospatially validated by the scientific reach back team. In general, this consists of conducting geo-registration using a USGS Digital Elevation Model (DEM) which promotes superior pixel computation and lessens topographic distortion. The image is checked by the team (using a Google Earth base map) for proper location and rotation.

Airborne radiological measurements are conducted using three fully integrated multi-crystal sodium iodide (NaI) RSX4 gamma ray spectrometers. Each RSX4 spectrometer contains four 4"x2"x16" doped NaI crystals each having an independent photomultiplier/spectrometer assembly. One RSX unit is configured with an additional upward NaI crystal utilized to provide real-time cosmic ray correction. Count and energy data from each crystal and pack is combined using a self-calibrating signal processor to generate a virtual detector output. All radiological spectrometer "packs" are further combined using a signal console controlled by the on-board central computer in the aircraft. Altitude correction data is provided by a radar altimeter with internal GPS systems within the packs serving as a backup. It should be noted that no radiological measurements were conducted on this mission.

Data is processed using automated algorithms onboard the aircraft with preliminary results being sent using a satellite system to the ASPECT scientific reach back team for QA/QC analysis. Upon landing, preliminary data results are examined and validated by the

scientific reach back team.

Table 1. ASPECT Automated Compounds

This table contains ASPECT's library of automated compounds.

Detection limits are for each chemical is found in parenthesis in units of parts per million (ppm)

Acetic Acid (2.0)	Cumene (23.1)	Isoprene (6.5)	Phosphine (8.3)
Acetone (5.6)	Diborane (5.0)	Isopropanol (8.5)	Phosphorus Oxychloride (2.0)
Acrolein (8.8)	1,1-Dichloroethene (3.7)	Isopropyl Acetate (0.7)	Propyl Acetate (0.7)
Acrylonitrile (12.5)	Dichloromethane (6.0)	MAPP (3.7)	Propylene (3.7)
Acrylic Acid (3.3)	Dichlorodifluoromethane (0.7)	Methyl Acetate (1.0)	Propylene Oxide (6.8)
Allyl Alcohol (5.3)	1,1-Difluoroethane (0.8)	Methyl Acrylate (1.0)	Silicon Tetrafluoride (0.2)
Ammonia (2.0)	Difluoromethane (0.8)	Methyl Ethyl Ketone (7.5)	Sulfur Dioxide (15)
Arsine (18.7)	Ethanol (6.3)	Methanol (5.4)	Sulfur Hexafluoride (0.07)
Bis-Chloroethyl Ether (1.7)	Ethyl Acetate (0.8)	Methylbromide (60)	Sulfur Mustard (6.0)
Boron Tribromide (0.2)	Ethyl Acrylate (0.8)	Methylene Chloride (1.1)	Sulfuryl Fluoride (1.5)
Boron Trifluoride (5.6)	Ethyl Formate (1.0)	Methyl Methacrylate (3.0)	Tetrachloroethylene (10)
1,3-Butadiene (5.0)	Ethylene (5.0)	MTEB (3.8)	1,1,1-Trichloroethane (1.9)
1-Butene (12.0)	Formic Acid (5.0)	Naphthalene (3.8)	Trichloroethylene (2.7)
2-Butene (18.8)	Freon 134a (0.8)	n-Butyl Acetate (3.8)	Trichloromethane (0.7)
Carbon Tetrachloride (0.2)	GA (Tabun) (0.7)	n-Butyl Alcohol (7.9)	Triethylamine (6.2)
Carbonyl Fluoride (0.8)	GB (Sarin) (0.5)	Nitric Acid (5.0)	Triethylphosphate (0.3)
Carbon Tetrafluoride (0.1)	Germane (1.5)	Nitrogen Mustard (2.5)	Trimethylamine (9.3)
Chlorodifluoromethane (0.6)	Hexafluoroacetone (0.4)	Nitrogen Trifluoride (0.7)	Trimethyl Phosphite (0.4)
Chloromethane (12)	Isobutylene (15)	Phosgene (0.5)	Vinyl Acetate (0.6)

Airborne Spectral Photometric Environmental Collection Technology

ASPECT Air Quality Survey after Hurricane Ida Baton Rouge, LA September 11, 2021



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Acronyms and Abbreviations

Alt	Altitude (in feet)
AGL	Above Ground Level
cm	centimeter
CDT	Central Daylight Time
DEM	Digital Elevation Model
ESF-10	Emergency Support Function #10 – Oil and Hazardous Materials Response
FEMA	Federal Emergency Management Agency
FTIR	Fourier Transform Infrared Spectrometer
FTP	File Transfer Protocol
igm	Spectral data format based on grams format
IR	Infrared
IRLS	Infrared Line Scanner
jpg	JPEG image format
Kts	Knots
LDEQ	Louisiana Department of Environmental Quality
mph	miles per hour
m/s	meters per second
MSIC	Digital photography file from the Imperx mapping camera
MSL	Mean Sea Level Altitude (in feet)
PAN	peroxyacetyl nitrate
Ppm	parts per million
RMP	Risk Management Plan

Executive Summary

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 29 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2nd, 2021, the State of Louisiana requested ESF-10 assistance through FEMA and Region 6 asked for the ASPECT plane to be deployed in support of the response to Hurricane Ida. The state wanted assistance monitoring facility emissions in the industrial area between Baton Rouge and New Orleans, where flaring is resulting in the visible emission of black smoke.

ASPECT was tasked to perform remote chemical sensing over target properties to screen for airborne chemicals and take high-resolution photos to provide situational awareness. Potential areas identified for monitoring included: East Baton Rouge, Ascension, Iberville, St. James, St. John, St. Charles, Jefferson, and Orleans. The system conducted one flight mission on September 2 including air monitoring survey collections over the target area with favorable weather conditions for all passes. Although two black plumes were visible over one of the sites, no major emissions were detected with the FTIR.

A continuation of the overall Baton Rouge facility survey was conducted on September 3. Two data collection flights were conducted which bracketed a Presidential temporary flight restriction not allowing any flight activity. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Flight 5 and 6 were conducted as part of survey operations conducted on September 4. A total of 17 facilities were surveyed. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm in addition to ozone and peroxyacetyl nitrate. Analysis of IR imagery indicated that some facilities are showing hot process units.

ASPECT conducted two data collection missions on September 5 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 32 active data collection passes were made covering 21 facilities. Imagery collected within impact areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

Two data collection missions were conducted by ASPECT on September 7 with the primary focus to collect additional data over target surveyed on September 5 (St. Bernard, Terrebonne, St. Charles, and St. James areas). A total of 16 data collection passes (2 test

and 14 active) were made over about half of the target list. Weather conditions complicated the mission with numerous convective cells and low clouds in the area. No compounds were detected on either flight. conducted two data collection missions on 5 September 2021 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas.

ASPECT conducted two missions on September 8 with the primary objective to complete the mission of collecting additional data at facilities assigned on September 7. Weather conditions over the target areas within St. Bernard, Terrebonne, St. Charles, and St. James parishes was marginal due to clouds and convective activity. A total of 21 data collection passes (2 test and 19 active) were required to complete the mission with no detections observed.

ASPECT conducted two oil survey missions on September 11 which included 32 data collection passes (2 test and 30 active). 8 grid areas were developed, and the system was able to survey grids 3 through 8 due to time on station. Oil was detected in four data collection passes in grids 6 and 7. Isoprene was detected on pass 18 at a low level of 0.249 ppm. No other compounds were detected.

ASPECT Air Quality Survey

Hurricane IDA

Baton Rouge, LA

September 11, 2021

Background and Operational Overview

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 29 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2, 2021, ASPECT was tasked to conduct a wide area air quality screening level assessment of areas populated with Risk Management Plan (RMP) sites and petrochemical facilities using the ASPECT system for detections of any airborne contaminants from ASPECT's 76 chemical detection library in the areas affected by Ida. The Region wanted to know if any detections were found, the location of the detection, and the concentration detected. Sites including Marathon Petroleum Company, Shell Norco Facility, and Phillips 66 pipeline site were surveyed. There were no chemical detections at the sites surveyed. Extremely slow satellite transmission speeds (possibly due to high bandwidth use by other first responders) resulted in long delays in data collection. Some chemical photos were pulled down during flight, with the majority needing to be pulled down with a more high-speed internet connection on the ground.

On September 3 ASPECT was tasked with a continuation of the general Baton Rouge area survey and conducted two flights. 8 locations in the Baton Rouge area were surveyed as part of two flights. A total of 12 active data collection passes were made covering 8 facilities with no chemical plumes or compounds being detected. Other than flares and isolated steam plumes, little process activity was noted in the data.

Two data collection flights were conducted on September 4 focusing on facilities south of Baton Rouge. A total of 29 active data collection passes were made covering 17 facilities. Analysis of IR imagery indicated that some facilities are showing hot process units. Ammonia was detected and confirmed at a maximum concentration of approximately 14 ppm.

ASPECT conducted two data collection missions on September 5 with the focus being facilities in St. Bernard, Terrebonne, St. Charles, and St. James areas. A total of 32 active data collection passes were made covering 21 facilities. Imagery collected within impact

areas of the storm showed some oil sheen and releases to secondary containment. No compounds were detected on either mission.

Due to poor weather, ASPECT did not conduct any flight activities on September 6. ASPECT was tasked with two missions on September 7 consisting largely of revisiting facilities surveyed on September 5 for the purpose of collecting additional data.

ASPECT conducted two missions on September 8 with the primary objective to complete the mission of collecting additional data at facilities assigned on September 7. Weather conditions over the target areas within St. Bernard, Terrebonne, St. Charles, and St. James parishes was marginal due to clouds and convective activity. A total of 21 data collection passes (2 test and 19 active) were required to complete the mission with no detections observed.

ASPECT did not conduct missions on September 9 or September 10 but was tasked with an oil detection mission on September 11. The Louisiana Department of Environmental Quality (LDEQ) and the Louisiana Oil Spill Coordinator's Office (LOSCO) provided several prioritized target areas located in an area encompassing Port Fourchon and north toward New Orleans. Figure 1 shows the target survey areas marked with white boxes.

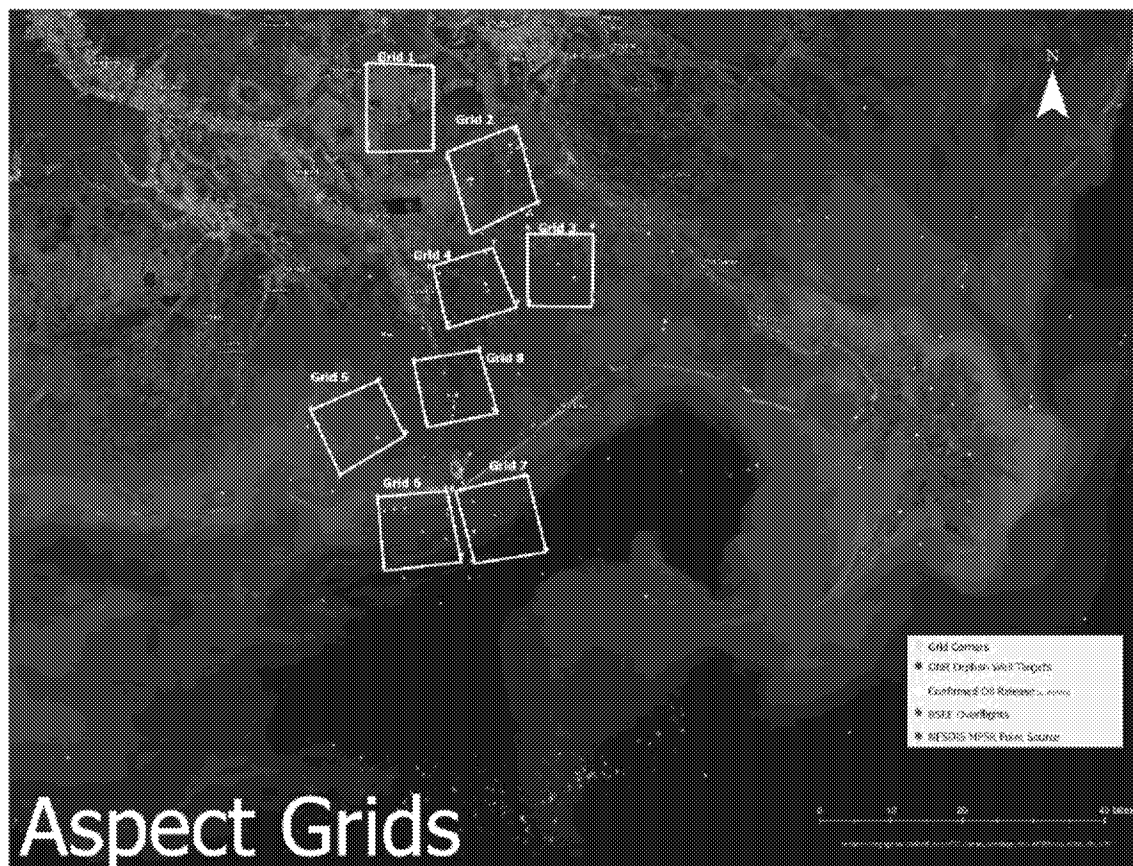


Figure 1. LDEQ Oil Survey Area, September 11, 2021

General Mission Objectives

Once granted access to fly over the sites, the following general mission objectives were employed in conducting data collection with ASPECT:

1. To capture an overall, situational awareness of the incident using aerial photography with:
 - Oblique camera—photos taken by hand from the view/position of the co-pilot, and
 - MSIC photos—advanced camera mounted underneath the plane for a top-down view of the designated sites.
2. To qualitatively locate and characterize any visible and non-visible components of a plume, oil on water, as well as any areas on fire:
 - Using the Infrared Line Scanner (IRLS)
3. To screen for the presence and location of specific chemicals within ASPECT's automated chemical detection library:
 - Using the Fourier Transform Infrared (FTIR) Spectrometer

Flight Conditions and Status

Weather and Site Conditions

Prior to each flight, an updated status of the current and forecasted weather, site conditions and any potential flight obstacles including radio towers impacting safety is assessed by the crew. A summary of the ground weather conditions during the missions can be found in Tables 1 and 2.

**Table 1. Ground Weather for New Orleans, LA, Flight 13
September 11, 2021**

Time	1053	1153	1253	1353	1453	1553
Wind direction	45 degrees NE	45 degrees NE	22.5 degrees NNE	45 degrees NE	67.5 degrees ENE	90 degrees E
Wind speed	4.0 m/s (9.0 mph)	4.5 m/s (10.0 mph)	4.5 m/s (10.0 mph)	4.5 m/s (10.0 mph)	4.0 m/s (9.0 mph)	3.6 m/s (8.0 mph)
Temperature	28.3 C	28.3 C	29.4 C	30.0 C	30.6 C	30.0 C
Relative humidity	48	44	42	40	40	45
Dew point	16.1 C	15.0 C	15.0 C	15.0 C	15.6 C	16.7 C
Pressure	1021.4 mb	1021.4 mb	1020.7 mb	1020.4 mb	1020.1 mb	1019.4 mb
Ceiling	Few 4800 Ft	Few 5500 Ft	Few 5500 Ft	Few 5500 Ft	Few 6000 Ft	Scattered 5500 Ft

**Table 2. Ground Weather for New Orleans, LA, Flight 14
September 11, 2021**

Time	1653	1753	1853
Wind direction	90 degrees E	90 degrees E	90 degrees E
Wind speed	4.5 m/s (10.0 mph)	5.4 m/s (12.0 mph)	3.6 m/s (8.0 mph)
Temperature	29.4 C	28.9 C	27.8 C
Relative humidity	46	49	56
Dew point	16.7 C	17.2 C	18.3 C
Pressure	1019.4 mb	1019.7 mb	1019.7 mb
Ceiling	Few 5500 Ft	Few 5000 Ft	Few 5000 Ft

Data Results

The following data is provided as a summary analysis. All data products are available for the Region to access on a shared FTP site. For a complete list of available products, see Appendix A. The data collected during these missions included a flight path summary, IRLS images, FTIR chemical identification and quantification, high resolution MSIC photos, and oblique photos.

Flight Paths

Wide, slow turns are required to be made in between runs to keep the instruments stable. The blue lines indicate the flight path while the green lines indicate the specific sections of the flight where chemical and oil data was collected and processed. The mission focus consisted of 8 survey areas positions between Port Fourchon, and New Orleans (Figure 2) ASPECT completed 6 of the 8 grids as shown in Figures 3 and 4.



Figure 2. Survey Grid Cells

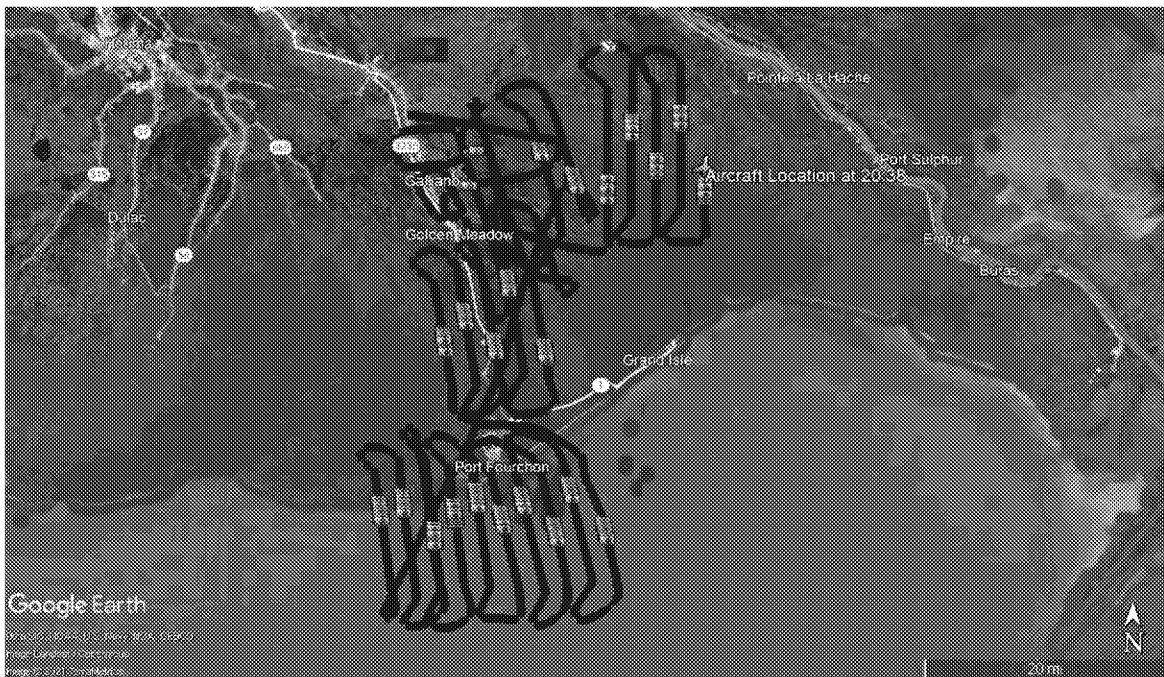


Figure 3. Oil Survey Flight Path, Flight 13, September 11, 2021

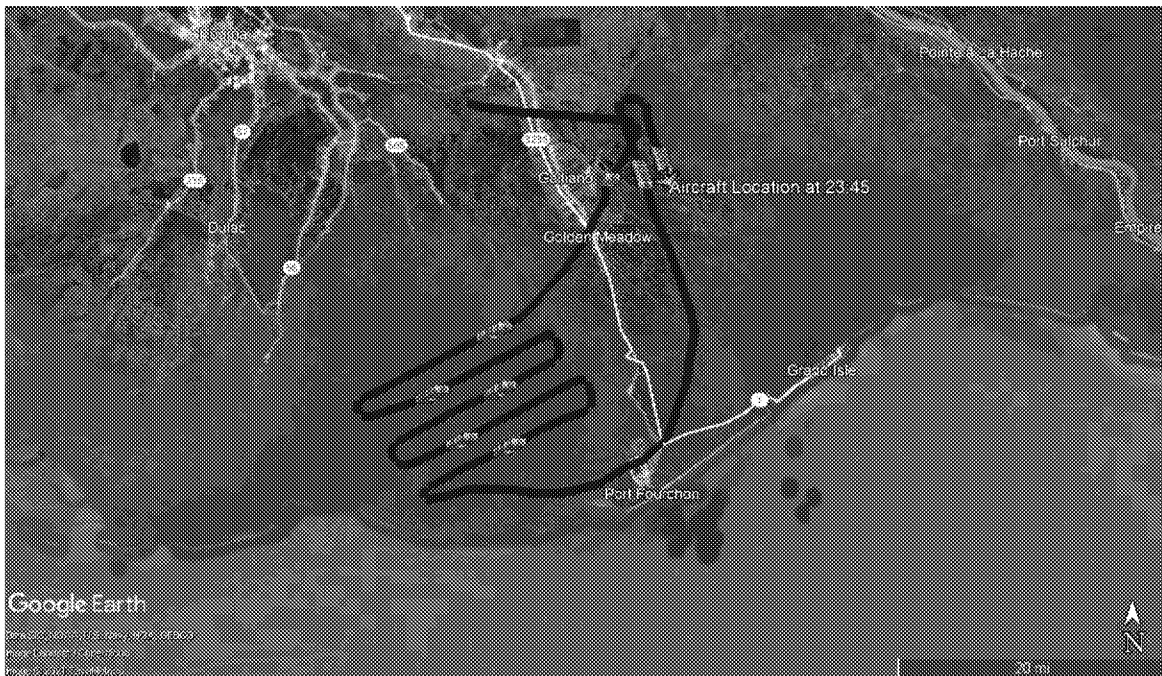


Figure 4. Oil Survey Flight Path, Flight 14, September 11, 2021

Line Scanner Data/Oil Results

A total of 32 data collection runs (2 tests and 30 active) were made over the target grid cells and an infrared line scanner image was generated for each collection run. In addition to the stock IR analysis, Flights 13 and 14 utilized two methods of oil detection analysis.

Oil detection with IR systems is routinely conducted by measuring the temperature difference and emissivity between the water and the oil. This differential is a result of differences between the water and oil emissivity and the subsequent solar heating and cooling of the oil. Oil on water in the open can be detected using the difference in emissivity. Although simple thermal imaging methods can be used in this scenario, a multi-spectral pattern recognition method provides an improved detection with fewer false alarms. An unsupervised method called ISOData (similar to K-means) is employed to cluster data into groups such as sheen, light, or heavy oil on water in open water. Since this method is a pattern recognition approach, natural signatures such as floating vegetation, fresh/saltwater interfaces, and sea foam are not classified as oil. Although the IsoData method is very robust for open ocean conditions, the model does have limitations to thermal gradient changes. For areas in shallow/marsh environments an enhanced detection solution is employed for the wide changes observed for thermal changes to discriminate between signatures including vegetation and land features. To overcome the marsh environment complexities, ASPECT uses a neural network supervised classification method which requires a training set containing oil (called actives) and a set that does not contain oil (inactive). This data set includes examples that have high thermal gradients, land features, and vegetation. The subsequent classification and separation of these two

sets of data provides a high degree of oil detection with low false alarm rates in the shallow environment.

Analysis of all data collection passes for the two missions showed the presence of oil (greater than a sheen) in four collection runs. Figure 5A and 5B shows an oil detection and photo image set collected on Flight 13, pass 6 within Grid 6. Active oil presence is shown by the orange color with the density of the color being proportional to the quantity of oil on the water. A comparison of this image to the aerial images illustrates the contrast of the images and the fact that oil on water in photographic images is complicated by observation angle, sun angle, and the color of the water. Oil was likewise detected in Grid 5 conducted on Flight 14. The locations (image positions) of all oil detections are given in Figure 6. No other significant oil detections were made in Grids 3,4, or 8. Grids 1 and 2 were not surveyed on the missions conducted on 11 September, 2021.



Figure 5A. Oil Detection Image, Flight 13, Run 6, Grid 6, September 11, 2021



Figure 5B. Oil Photo Image, Flight 13, Run 6, Grid 6, September 11, 2021



Figure 6. Oil Detection Locations for Flight 13, September 11, 2021

FTIR Data Results

FTIR spectral data at a resolution of 16 wavenumbers was collected for each run. ASPECT uses an automated detection algorithm to permit compounds to be automatically analyzed while the aircraft is in flight. Seventy-six chemical compounds are included in the airborne

algorithm library (the list is provided in Appendix C, Table 1). In addition, collected data was also manually quality checked against a collection of published library spectra for each chemical detected.

The only compound that ASTECT detected was isoprene on Flight 13. The location of the detection is given in Figure 7. No compounds were detected on Flight 14. Details of the monitoring results can be found in Tables 3 and 4.

**Table 3. Chemical Results Summary
Oil Survey, Flight 13**

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-11	16:13:28	Test	Test
2		16:38:36	ND	ND
3		17:11:11	ND	ND
4		17:19:19	ND	ND
5		17:43:46	ND	ND
6		17:49:20	ND	ND
7		17:58:48	ND	ND
8		18:16:58	ND	ND
9		18:23:18	ND	ND
10		18:33:29	ND	ND
11		18:40:20	ND	ND
12		18:49:38	ND	ND
13		18:57:46	ND	ND
14		19:07:30	ND	ND
15		19:17:19	ND	ND
16		19:24:56	ND	ND
17		19:32:14	ND	ND
18		19:39:57	Isoprene	0.249
19		19:49:07	ND	ND
20		20:00:14	ND	ND
21		20:10:13	ND	ND
22		20:19:17	ND	ND
23		20:27:54	ND	ND
24		20:36:42	ND	ND

**Table 4. Chemical Results Summary
Oil Survey, Flight 14**

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-11	22:34:07	Test	Test
2		22:40:31	ND	ND
3		22:49:12	ND	ND
4		22:57:35	ND	ND
5		23:05:35	ND	ND

6		23:15:05	ND	ND
7		23:38:28	ND	ND
8		23:44:38	ND	ND



Figure 7. Isoprene Detection Location, Run 18, Flight 13

Aerial Photography Results

A full set of high-resolution aerial digital photography were collected as part of each data collection pass. An aerial image of light sheen observed in grid 7 is shown in Figure 8. Due to the focus of the mission, only a few oblique images were collected on Flight 13 (none on Flight 14). Figure 9 shows one of the oblique images showing a tank battery in the survey area.

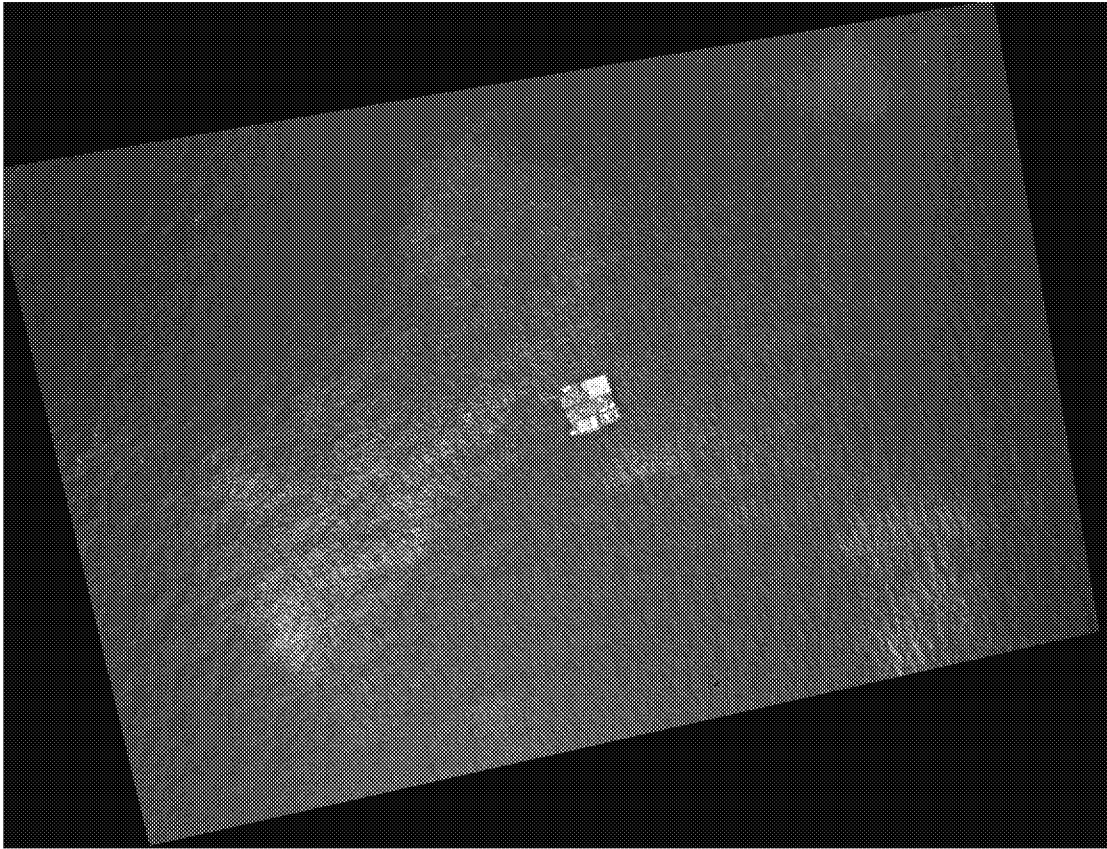


Figure 8. MSIC image of light sheen, Pass 12, Grid 7, Flight 13, September 11, 2021



Figure 9. Oblique photo of a tank battery, Flight 13, September 11, 2021

Conclusion

ASPECT conducted two oil survey missions on September 11, 2021 which included 32 data collection passes (2 test and 30 active). 8 grid areas were developed, and the system was able to survey grids 3 through 8 due to time on station. Oil was detected in four data collection passes in grids 6 and 7. Isoprene was detected on pass 18 at a low level of 0.249 ppm. No other compounds were detected.

Appendix A: File Names of Data Collected During Flight

Oil Survey, Flight 13, September 11, 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	16:13:28	2839	108	20210911161334708.jpg 20210911161341073.jpg 20210911161347422.jpg	20210911_161331_A.igm	2021_09_11_16_13_33_R_01 TA=24.9;TB=45.7;Gain=3	
2	16:38:36	2849	110	20210911163842654.jpg 20210911163849018.jpg 20210911163855367.jpg	20210911_163839_A.igm	2021_09_11_16_38_41_R_02 TA=28.4;TB=48.4;Gain=3	
3	17:11:11	2850	104	20210911171116389.jpg 20210911171123643.jpg 20210911171130007.jpg 20210911171136356.jpg 20210911171142705.jpg	20210911_171114_A.igm	2021_09_11_17_11_16_R_03 TA=21.9;TB=41.9;Gain=3	
4	17:19:19	2872	107	20210911171924815.jpg 20210911171932084.jpg 20210911171938434.jpg 20210911171944798.jpg 20210911171951147.jpg 20210911171957496.jpg 20210911172003861.jpg 20210911172010210.jpg	20210911_171922_A.igm 20210911_172001_A.igm	2021_09_11_17_19_24_R_04 TA=21.6;TB=41.5;Gain=3	
5	17:43:46	2886	117	20210911174352859.jpg 20210911174359208.jpg 20210911174405573.jpg 20210911174411922.jpg 20210911174418287.jpg 20210911174424636.jpg 20210911174430985.jpg 20210911174437350.jpg	20210911_174350_A.igm 20210911_174429_A.igm	2021_09_11_17_43_51_R_05 TA=21.9;TB=41.9;Gain=3	
6	17:49:20	2934	111	20210911174926055.jpg 20210911174932404.jpg 20210911174938753.jpg 20210911174946023.jpg 20210911174952372.jpg 20210911174958737.jpg 20210911175005086.jpg 20210911175011450.jpg	20210911_174923_A.igm 20210911_175003_A.igm	2021_09_11_17_49_25_R_06 TA=23.5;TB=42.7;Gain=3	
7	17:58:48	2857	110	20210911175854387.jpg 20210911175900736.jpg 20210911175907101.jpg 20210911175913450.jpg 20210911175919799.jpg 20210911175926164.jpg 20210911175932513.jpg 20210911175939782.jpg	20210911_175852_A.igm 20210911_175930_A.igm	2021_09_11_17_58_53_R_07 TA=23.5;TB=43.7;Gain=3	
8	18:16:58	2876	116	20210911181703851.jpg 20210911181710200.jpg 20210911181716549.jpg 20210911181722914.jpg 20210911181730168.jpg 20210911181736533.jpg 20210911181742882.jpg 20210911181749247.jpg	20210911_181701_A.igm 20210911_181740_A.igm	2021_09_11_18_17_03_R_08 TA=23.3;TB=43.2;Gain=3	
9	18:23:18	2867	110	20210911182324256.jpg 20210911182331510.jpg 20210911182337874.jpg 20210911182344223.jpg	20210911_182321_A.igm 20210911_182401_A.igm	2021_09_11_18_23_24_R_09 TA=23.1;TB=43.2;Gain=3	

				20210911182350573.jpg 20210911182356937.jpg 20210911182403287.jpg 20210911182409651.jpg 20210911182414191.jpg			
10	18:33:29	2871	115	20210911183335261.jpg 20210911183341610.jpg 20210911183347975.jpg 20210911183354324.jpg 20210911183400673.jpg 20210911183407038.jpg 20210911183413387.jpg 20210911183419752.jpg	20210911_183331_A.igm 20210911_183411_A.igm	2021_09_11_18_33_34_R_10 TA=23.0;TB=43.2;Gain=3	
11	18:40:20	2872	111	20210911184026525.jpg 20210911184032890.jpg 20210911184039239.jpg 20210911184045604.jpg 20210911184051953.jpg 20210911184059207.jpg 20210911184105572.jpg 20210911184111921.jpg	20210911_184023_A.igm 20210911_184102_A.igm	2021_09_11_18_40_26_R_11 TA=23.3;TB=43.2;Gain=3	
12	18:49:38	2833	109	20210911184944881.jpg 20210911184951246.jpg 20210911184957595.jpg 20210911185003945.jpg 20210911185010309.jpg 20210911185016659.jpg 20210911185023023.jpg 20210911185029373.jpg 20210911185035722.jpg	20210911_184942_A.igm 20210911_185021_A.igm	2021_09_11_18_49_44_R_12 TA=23.1;TB=43.2;Gain=3	
13	18:57:46	2854	108	20210911185752427.jpg 20210911185758776.jpg 20210911185805141.jpg 20210911185811490.jpg 20210911185818744.jpg 20210911185825109.jpg 20210911185831458.jpg 20210911185837823.jpg	20210911_185749_A.igm 20210911_185828_A.igm	2021_09_11_18_57_52_R_13 TA=23.4;TB=43.3;Gain=3	
14	19:07:30	2828	111	20210911190736196.jpg 20210911190742546.jpg 20210911190748902.jpg 20210911190755267.jpg 20210911190801616.jpg 20210911190807981.jpg 20210911190814330.jpg 20210911190820679.jpg	20210911_190733_A.igm 20210911_190812_A.igm	2021_09_11_19_07_35_R_14 TA=23.0;TB=43.0;Gain=3	
15	19:17:19	2847	111	20210911191725419.jpg 20210911191731768.jpg 20210911191738133.jpg 20210911191744482.jpg 20210911191750847.jpg 20210911191757196.jpg 20210911191803546.jpg 20210911191809910.jpg 20210911191813530.jpg	20210911_191722_A.igm 20210911_191802_A.igm	2021_09_11_19_17_24_R_15 TA=23.0;TB=43.0;Gain=3	
16	19:24:56	2844	108	20210911192502998.jpg 20210911192509351.jpg 20210911192515700.jpg 20210911192522059.jpg 20210911192528424.jpg 20210911192534773.jpg	20210911_192459_A.igm 20210911_192538_A.igm	2021_09_11_19_25_02_R_16 TA=22.0;TB=41.9;Gain=3	

				20210911192541122.jpg 20210911192547487.jpg			
17	19:32:14	2869	108	20210911193220600.jpg 20210911193227870.jpg 20210911193234219.jpg 20210911193240568.jpg 20210911193246933.jpg 20210911193253282.jpg 20210911193259647.jpg 20210911193305996.jpg	20210911_193218_A.igm 20210911_193258_A.igm	2021_09_11_19_32_20_R_17 TA=22.7;TB=42.7;Gain=3	
18	19:39:57	2864	105	20210911194003624.jpg 20210911194009989.jpg 20210911194016338.jpg 20210911194022687.jpg 20210911194029052.jpg 20210911194035401.jpg 20210911194041750.jpg 20210911194049020.jpg	20210911_194000_A.igm 20210911_194039_A.igm	2021_09_11_19_40_03_R_18 TA=22.0;TB=42.0;Gain=3	
19	19:49:07	2861	103	20210911194912896.jpg 20210911194919261.jpg 20210911194926515.jpg 20210911194932880.jpg 20210911194939229.jpg 20210911194945578.jpg 20210911194951943.jpg 20210911194958292.jpg	20210911_194911_A.igm 20210911_194949_A.igm	2021_09_11_19_49_13_R_19 TA=22.4;TB=42.4;Gain=3	
20	20:00:14	2838	108	20210911200020207.jpg 20210911200026556.jpg 20210911200032906.jpg 20210911200039270.jpg 20210911200045621.jpg 20210911200051970.jpg 20210911200058335.jpg 20210911200105589.jpg 20210911200111953.jpg	20210911_200017_A.igm 20210911_200057_A.igm	2021_09_11_20_00_20_R_20 TA=23.0;TB=43.0;Gain=3	
21	20:10:13	2831	107	20210911201019409.jpg 20210911201025758.jpg 20210911201032120.jpg 20210911201038469.jpg 20210911201044828.jpg 20210911201051193.jpg 20210911201057542.jpg 20210911201103891.jpg	20210911_201015_A.igm 20210911_201056_A.igm	2021_09_11_20_10_19_R_21 TA=22.6;TB=42.4;Gain=3	
22	20:19:17	2835	106	20210911201923231.jpg 20210911201929596.jpg 20210911201935945.jpg 20210911201942310.jpg 20210911201948659.jpg 20210911201955928.jpg 20210911202002278.jpg 20210911202008627.jpg	20210911_201920_A.igm 20210911_201959_A.igm	2021_09_11_20_19_23_R_22 TA=22.8;TB=42.8;Gain=3	
23	20:27:54	2829	104	20210911202759825.jpg 20210911202807094.jpg 20210911202813444.jpg 20210911202819808.jpg 20210911202826158.jpg 20210911202832507.jpg 20210911202838872.jpg 20210911202845221.jpg	20210911_202756_A.igm 20210911_202837_A.igm	2021_09_11_20_28_00_R_23 TA=22.8;TB=42.8;Gain=3	
24	20:36:42	2812	107	20210911203648221.jpg 20210911203654570.jpg	20210911_203644_A.igm 20210911_203725_A.igm	2021_09_11_20_36_49_R_24 TA=23.1;TB=43.1;Gain=3	

				20210911203701843.jpg 20210911203708192.jpg 20210911203714557.jpg 20210911203720906.jpg 20210911203727255.jpg 20210911203733620.jpg			
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Oil Survey, Flight 14, September 11, 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	22:34:07	2822	109	20210911223413567.jpg 20210911223419932.jpg 20210911223426281.jpg	20210911_223409_A.igm	2021_09_11_22_34_11_R_01 TA=24.9;TB=44.8;Gain=3	
2	22:40:31	2854	116	20210911224037607.jpg 20210911224043971.jpg 20210911224050321.jpg 20210911224056670.jpg 20210911224103939.jpg 20210911224110289.jpg 20210911224116653.jpg 20210911224123010.jpg	20210911_224035_A.igm 20210911_224113_A.igm	2021_09_11_22_40_35_R_02 TA=21.4;TB=41.5;Gain=3	
3	22:49:12	2896	99	20210911224918738.jpg 20210911224925103.jpg 20210911224931452.jpg 20210911224937801.jpg 20210911224944166.jpg 20210911224950515.jpg 20210911224956878.jpg 20210911225003227.jpg 20210911225006855.jpg	20210911_224916_A.igm 20210911_224955_A.igm	2021_09_11_22_49_17_R_03 TA=21.8;TB=41.7;Gain=3	
4	22:57:35	2842	108	20210911225741713.jpg 20210911225748062.jpg 20210911225754427.jpg 20210911225800776.jpg 20210911225807141.jpg 20210911225813496.jpg 20210911225819845.jpg 20210911225826204.jpg	20210911_225738_A.igm 20210911_225817_A.igm	2021_09_11_22_57_39_R_04 TA=21.7;TB=41.7;Gain=3	
5	23:05:35	2891	97	20210911230541079.jpg 20210911230547444.jpg 20210911230553793.jpg 20210911230600152.jpg 20210911230606501.jpg 20210911230612860.jpg 20210911230619210.jpg 20210911230625574.jpg	20210911_230537_A.igm 20210911_230616_A.igm	2021_09_11_23_05_38_R_05 TA=21.0;TB=41.2;Gain=3	
6	23:15:05	2774	104	20210911231511236.jpg 20210911231517601.jpg 20210911231523950.jpg 20210911231530299.jpg 20210911231536664.jpg 20210911231543918.jpg 20210911231550283.jpg 20210911231556632.jpg	20210911_231508_A.igm 20210911_231547_A.igm	2021_09_11_23_15_09_R_06 TA=21.2;TB=41.4;Gain=3	

7	23:38:28	2571	105	20210911233834842.jpg 20210911233841200.jpg 20210911233847549.jpg 20210911233853910.jpg 20210911233900260.jpg 20210911233906618.jpg 20210911233913888.jpg 20210911233920237.jpg	20210911_233831_A.igm 20210911_233911_A.igm	2021_09_11_23_38_33_R_07 TA=22.1;TB=42.3;Gain=3	
8	23:44:38	2646	104	20210911234444365.jpg 20210911234450714.jpg 20210911234457064.jpg 20210911234503428.jpg 20210911234509778.jpg 20210911234516127.jpg 20210911234522492.jpg 20210911234528841.jpg	20210911_234441_A.igm 20210911_234521_A.igm	2021_09_11_23_44_42_R_08 TA=21.6;TB=41.7;Gain=3	

**Appendix B: Priority Sites Provided by EPA Region 6 & Louisiana Department of
Environmental Quality**

Facility_Name	Latitude	Longitude	Parish
Deltech LLC - Baton Rouge Facility	30.552892	-91.200536	East Baton Rouge
ExxonMobil Chemical Co - Baton Rouge Plastics Plant	30.551419	-91.175611	East Baton Rouge
ExxonMobil Baton Rouge Chemical Plant	30.484336	-91.169644	East Baton Rouge
Marathon Petroleum Co LP	30.068394	-90.596364	St. John the Baptist
Westlake Vinyls Co LP	30.209167	-91.017222	Ascension
Valero Refining - Meraux LLC - Meraux Refinery	29.930222	-89.944917	St. Bernard
Cornerstone Chemical Company	29.964722	-90.264722	Jefferson
Chalmette Refining LLC	29.937903	-89.969903	St. Bernard
ExxonMobil Chemical Company - Baton Rouge Chemicals North Plant	30.50465	-91.173219	East Baton Rouge
Equilon Enterprises LLC - Norco Refinery	29.995372	-90.410167	St. Charles
The Dow Chemical Company - Louisiana Operations	30.313927	-91.240586	Iberville
Rubicon LLC - Geismar Facility	30.20139	-91.01222	Ascension
BASF Corp - Geismar Site	30.18425	-91.002778	Ascension
Union Carbide Corp - St. Charles Plant	29.982289	-90.455622	St. Charles
Phillips 66 Co - Alliance Refinery	29.68406	-89.98145	Plaquemines
Axiall LLC - Plaquemine Facility	30.267167	-91.184258	Iberville
ExxonMobil Fuels & Lubricants Co - Baton Rouge Refinery	30.484392	-91.169444	East Baton Rouge
Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery	30.107684	-90.890796	St. James
Marathon Petroleum Company LP - Louisiana Refining Division - Garyville Refinery	30.061322	-90.593528	St. John the Baptist
BASF Corp - Zachary Site	29.547603	-90.523231	East Baton Rouge
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188	Ascension
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497	St. Charles
ExxonMobil Chemical Co - Baton Rouge Polyolefins Plant	30.56215	-91.20387	East Baton Rouge
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381	St. Charles
NOVA Chemicals Olefins LLC - Geismar Ethylene Plant	30.230619	-91.052884	Ascension
Roehm America LLC - MMA Plant	29.9575	-90.265833	Jefferson
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955	St. Charles
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.409722	St. Charles
BASF Corp - North Geismar Site	30.20594	-90.99195	Ascension
Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339	Plaquemines
Shintech Louisiana LLC - Shintech Plaquemine Plant	30.273611	-91.173333	Iberville
Denka Performance Elastomer LLC	30.053928	-90.524792	St. John the Baptist

Formosa Plastics Corp Louisiana	30.501722	-91.185944	East Baton Rouge
DuPont Specialty Products USA LLC - Pontchartrain Site	30.05388	-90.52472	St. John the Baptist
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722	St. Charles
Syngenta Crop Protection LLC - St Gabriel Plant	30.246728	-91.103508	Iberville
Mosaic Fertilizer LLC - Faustina Plant	30.083914	-90.91345	St. James
Mosaic Fertilizer LLC - Uncle Sam Plant	30.037222	-90.8275	St. James
LBC Baton Rouge LLC - Sunshine Terminal	30.294444	-91.148333	Iberville
Occidental Chemical Corporation - Convent Facility	30.055885	-90.830594	St. James
TOTAL Petrochemicals & Refining USA Inc - Carville Polystyrene Plant	30.229786	-91.073631	Iberville
Targa Midstream Services LLC	29.237034	-89.384977	Plaquemines
EnLink LIG Liquids LLC - Plaquemine Gas Processing Plant	30.236389	-91.241389	Iberville
EnLink LIG Liquids LLC - Gibson Gas Processing Plant	29.643056	-90.961944	Terrebonne
NuStar Logistics LP - St James Terminal	30.030065	-90.843463	St. James
Enterprise Gas Processing LLC - Norco Fractionation Plant	30.015411	-90.402958	St. Charles
Lone Star NGL Refinery Services LLC - Geismar Fractionation Plant	30.218889	-91.035833	Ascension
INEOS Oxide - A Division of INEOS Americas LLC	30.313889	-91.240278	Iberville
Discovery Producer Services LLC - Discovery Paradis Fractionation Plant	29.858889	-90.453333	St. Charles
Plains Marketing LP - St James Terminal	30.004341	-90.848449	St. James
Methanex USA Services LLC - Geismar Methanol Plant	30.206667	-91.020833	Ascension
Dyno Nobel LA Ammonia LLC - Ammonia Production Facility	29.964789	-90.264625	Jefferson
Kinder Morgan Liquids Terminals LLC - Geismar Methanol Terminal	30.205389	-91.023792	Ascension
South LA Methanol LP - St James Methanol Plant	30.039917	-90.863819	St. James
YCI Methanol Plant	29.97481	-90.86775	St. James
IGP Methanol LLC - Gulf Coast Methanol Complex	29.625453	-89.926611	Plaquemines
KMe St James Holdings LLC - Methanol Terminal	29.990919	-90.841239	St. James
Kemira Chemicals Inc	29.964722	-90.264722	Jefferson
PHILLIPS 66 PIPELINE LLC	29.923889	-90.482498	St. Charles
CF INDUSTRIES	30.08328	-90.957665	Ascension

Appendix C: ASPECT Systems

The US EPA ASPECT system collects airborne infrared (IR) images and chemical screening data from a safe distance over the site (about 3,000 ft AGL). The system consists of an airborne high-speed Fourier Transform Infra-Red (FTIR) spectrometer coupled with a wide-area IR Line Scanner (IRLS). The ASPECT IR systems can detect chemical compounds in both the 8-to-12-micron (800 to 1200 cm^{-1}) and 3 to 5 micron (2000 to 3200 cm^{-1}) regions. List of chemicals and detection limits are listed in Table 1. The 8 to 12 micron region is typically known as the atmospheric window region since the band is reasonably void of water and carbon dioxide influence. Spectrally, this region is used to detect carbon - non-carbon bonded compounds. The 3 to 5 micron region is also free of water and carbon dioxide but typically does not have sufficient energy for use. This band does show use in high-energy environments such as fires. The carbon - hydrogen stretch is very common in this region.

An Imperx mapping camera (29 mega pixels; mapping focal plane array) is concurrently operated as part of all chemical collections. These images are often digitally processed in lower resolution, so they can be transmitted via satellite communication. All imagery is geo-rectified using both aircraft attitude correction (pitch, yaw, and roll) and GPS positional information. Imagery can be processed while in flight or approximately 600 frames per hour can be processed once the data are downloaded from the aircraft. The high-resolution images (>20 MB each) are pulled from the ASPECT after the sortie and are available later.

All aerial photographic images collected by the ASPECT system are ortho-rectified and geospatially validated by the scientific reach back team. In general, this consists of conducting geo-registration using a USGS Digital Elevation Model (DEM) which promotes superior pixel computation and lessens topographic distortion. The image is checked by the team (using a Google Earth base map) for proper location and rotation.

Airborne radiological measurements are conducted using three fully integrated multi-crystal sodium iodide (NaI) RSX4 gamma ray spectrometers. Each RSX4 spectrometer contains four 4"x2"x16" doped NaI crystals each having an independent photomultiplier/spectrometer assembly. One RSX unit is configured with an additional upward NaI crystal utilized to provide real-time cosmic ray correction. Count and energy data from each crystal and pack is combined using a self-calibrating signal processor to generate a virtual detector output. All radiological spectrometer "packs" are further combined using a signal console controlled by the on-board central computer in the aircraft. Altitude correction data is provided by a radar altimeter with internal GPS systems within the packs serving as a backup. It should be noted that no radiological measurements were conducted on this mission.

Data is processed using automated algorithms onboard the aircraft with preliminary results being sent using a satellite system to the ASPECT scientific reach back team for QA/QC analysis. Upon landing, preliminary data results are examined and validated by the

scientific reach back team.

Table 1. ASPECT Automated Compounds

This table contains ASPECT's library of automated compounds.

Detection limits are for each chemical is found in parenthesis in units of parts per million (ppm)

Acetic Acid (2.0)	Cumene (23.1)	Isoprene (6.5)	Phosphine (8.3)
Acetone (5.6)	Diborane (5.0)	Isopropanol (8.5)	Phosphorus Oxychloride (2.0)
Acrolein (8.8)	1,1-Dichloroethene (3.7)	Isopropyl Acetate (0.7)	Propyl Acetate (0.7)
Acrylonitrile (12.5)	Dichloromethane (6.0)	MAPP (3.7)	Propylene (3.7)
Acrylic Acid (3.3)	Dichlorodifluoromethane (0.7)	Methyl Acetate (1.0)	Propylene Oxide (6.8)
Allyl Alcohol (5.3)	1,1-Difluoroethane (0.8)	Methyl Acrylate (1.0)	Silicon Tetrafluoride (0.2)
Ammonia (2.0)	Difluoromethane (0.8)	Methyl Ethyl Ketone (7.5)	Sulfur Dioxide (15)
Arsine (18.7)	Ethanol (6.3)	Methanol (5.4)	Sulfur Hexafluoride (0.07)
Bis-Chloroethyl Ether (1.7)	Ethyl Acetate (0.8)	Methylbromide (60)	Sulfur Mustard (6.0)
Boron Tribromide (0.2)	Ethyl Acrylate (0.8)	Methylene Chloride (1.1)	Sulfuryl Fluoride (1.5)
Boron Trifluoride (5.6)	Ethyl Formate (1.0)	Methyl Methacrylate (3.0)	Tetrachloroethylene (10)
1,3-Butadiene (5.0)	Ethylene (5.0)	MTEB (3.8)	1,1,1-Trichloroethane (1.9)
1-Butene (12.0)	Formic Acid (5.0)	Naphthalene (3.8)	Trichloroethylene (2.7)
2-Butene (18.8)	Freon 134a (0.8)	n-Butyl Acetate (3.8)	Trichloromethane (0.7)
Carbon Tetrachloride (0.2)	GA (Tabun) (0.7)	n-Butyl Alcohol (7.9)	Triethylamine (6.2)
Carbonyl Fluoride (0.8)	GB (Sarin) (0.5)	Nitric Acid (5.0)	Triethylphosphate (0.3)
Carbon Tetrafluoride (0.1)	Germane (1.5)	Nitrogen Mustard (2.5)	Trimethylamine (9.3)
Chlorodifluoromethane (0.6)	Hexafluoroacetone (0.4)	Nitrogen Trifluoride (0.7)	Trimethyl Phosphite (0.4)
Chloromethane (12)	Isobutylene (15)	Phosgene (0.5)	Vinyl Acetate (0.6)

Message

From: DeGuenther, Michael [Michael.DeGuenther@WestonSolutions.com]
Sent: 9/3/2021 8:43:10 PM
To: Loesel, Matthew [loesel.matthew@epa.gov]; Patel, Anish [patel.anish@epa.gov]
CC: david.cook@westonsolutions.com
Subject: ASPECT - Facility Map INTERNAL
Attachments: INTERNAL - ASPECT MAP - Hurricane Ida_20210903.pdf

Michael DeGuenther, GIS Analyst I
Weston Solutions, Inc.
2929 Briarpark Dr. Ste. 175
Houston, TX 77042
Office: 713 - 985 - 6623
Cell: 972 - 757 - 9023
Michael.DeGuenther@WestonSolutions.com

CONFIDENTIALITY: This email and attachments may contain information which is confidential and proprietary. Disclosure or use of any such confidential or proprietary information without the written permission of Weston Solutions, Inc. is strictly prohibited. If you received this email in error, please notify the sender by return e-mail and delete this email from your system. Thank you.

Message

From: Patel, Anish [patel.anish@epa.gov]
Sent: 9/3/2021 8:46:23 PM
To: Assunto, Carmen [Assunto.Carmen@epa.gov]
CC: HQ EOC Public Information Officer [HQ_PIO@epa.gov]; Loesel, Matthew [loesel.matthew@epa.gov]; Roff, Nicholas [Roff.Nicholas@epa.gov]
Subject: Please Review - Hurricane Ida ASPECT Map for September 2
Attachments: ASPECT MAP - Hurricane Ida_20210903_Final.pdf

Carmen,

Please see the attached map for ASPECT flight conducted on September 2, 2021 for the Hurricane Ida response. Please review and approve to be posted on response website as **PUBLIC**.

Thanks in advance,

Anish Patel

Federal On Scene Coordinator (FOSC)

U.S. Environmental Protection Agency – Region 6

1201 Elm Street (SEDEC)

Dallas, TX 75270

Office: (214) 665-2288

Mobile: (469) 510-9721

Message

From: Taylor, Jillianne [Taylor.Jillianne@epa.gov]
Sent: 9/3/2021 8:52:53 PM
To: Loesel, Matthew [loesel.matthew@epa.gov]
Subject: RE: Photos and flight track from ASPECT over Axiall Facility 03Sept21

Hi Matt,

Yes, we'll work on getting a report together with the data from yesterday. It probably won't be ready until this evening since everyone is tied up working on the flight today.

From: Loesel, Matthew <loesel.matthew@epa.gov>
Sent: Friday, September 3, 2021 3:31 PM
To: Taylor, Jillianne <Taylor.Jillianne@epa.gov>
Subject: RE: Photos and flight track from ASPECT over Axiall Facility 03Sept21

Thanks Jillian, will there be a report for yesterday's flights as in the past?

From: Taylor, Jillianne <Taylor.Jillianne@epa.gov>
Sent: Friday, September 3, 2021 3:14 PM
To: brian.fontenot@la.gov; Delgado, Eric <Delgado.Eric@epa.gov>; Moore, Gary <Moore.Gary@epa.gov>; Patel, Anish <patel.anish@epa.gov>; Loesel, Matthew <loesel.matthew@epa.gov>; Argenta, Edward <Argenta.Edward@epa.gov>; Honnellio, Anthony <Honnellio.Anthony@epa.gov>
Subject: Photos and flight track from ASPECT over Axiall Facility 03Sept21

Some compressed images and flight track for the Axiall Facility.

Message

From: Assunto, Carmen [Assunto.Carmen@epa.gov]
Sent: 9/3/2021 9:17:19 PM
To: Patel, Anish [patel.anish@epa.gov]
CC: Loesel, Matthew [loesel.matthew@epa.gov]; Roff, Nicholas [Roff.Nicholas@epa.gov]
Subject: RE: Please Review - Hurricane Ida ASPECT Map for September 2

I will.

From: Patel, Anish <patel.anish@epa.gov>
Sent: Friday, September 3, 2021 4:04 PM
To: Assunto, Carmen <Assunto.Carmen@epa.gov>
Cc: Loesel, Matthew <loesel.matthew@epa.gov>; Roff, Nicholas <Roff.Nicholas@epa.gov>
Subject: RE: Please Review - Hurricane Ida ASPECT Map for September 2

Thank you M'am! Please be on a lookout for an email from either Nick Roff or Matt Loesel from 9/4 though 9/7. I will be out of office.

Anish Patel
Federal On Scene Coordinator (FOSC)
U.S. Environmental Protection Agency – Region 6
1201 Elm Street (SEDEC)
Dallas, TX 75270
Office: (214) 665-2288
Mobile: (469) 510-9721

From: Assunto, Carmen <Assunto.Carmen@epa.gov>
Sent: Friday, September 3, 2021 3:57 PM
To: Patel, Anish <patel.anish@epa.gov>
Cc: HQ EOC Public Information Officer <HQ_PIO@epa.gov>; Loesel, Matthew <loesel.matthew@epa.gov>; Roff, Nicholas <Roff.Nicholas@epa.gov>
Subject: RE: Please Review - Hurricane Ida ASPECT Map for September 2

Thank you, this is approved. Carmen

From: Patel, Anish <patel.anish@epa.gov>
Sent: Friday, September 3, 2021 3:46 PM
To: Assunto, Carmen <Assunto.Carmen@epa.gov>
Cc: HQ EOC Public Information Officer <HQ_PIO@epa.gov>; Loesel, Matthew <loesel.matthew@epa.gov>; Roff, Nicholas <Roff.Nicholas@epa.gov>
Subject: Please Review - Hurricane Ida ASPECT Map for September 2

Carmen,

Please see the attached map for ASPECT flight conducted on September 2, 2021 for the Hurricane Ida response. Please review and approve to be posted on response website as **PUBLIC**.

Thanks in advance,
Anish Patel
Federal On Scene Coordinator (FOSC)
U.S. Environmental Protection Agency – Region 6

1201 Elm Street (SEDEC)
Dallas, TX 75270
Office: (214) 665-2288
Mobile: (469) 510-9721

Message

From: Assunto, Carmen [Assunto.Carmen@epa.gov]
Sent: 9/3/2021 9:44:39 PM
To: Patel, Anish [patel.anish@epa.gov]
CC: HQ EOC Public Information Officer [HQ_PIO@epa.gov]; Loesel, Matthew [loesel.matthew@epa.gov]; Roff, Nicholas [Roff.Nicholas@epa.gov]
Subject: RE: Please Review - Hurricane Ida ASPECT Map for September 2

Approved. C

From: Patel, Anish <patel.anish@epa.gov>
Sent: Friday, September 3, 2021 4:37 PM
To: Assunto, Carmen <Assunto.Carmen@epa.gov>
Cc: HQ EOC Public Information Officer <HQ_PIO@epa.gov>; Loesel, Matthew <loesel.matthew@epa.gov>; Roff, Nicholas <Roff.Nicholas@epa.gov>
Subject: RE: Please Review - Hurricane Ida ASPECT Map for September 2

Ms. Carmen,

See attached for the revised map for approval.

Anish Patel
Federal On Scene Coordinator (FOSC)
U.S. Environmental Protection Agency – Region 6
1201 Elm Street (SEDEC)
Dallas, TX 75270
Office: (214) 665-2288
Mobile: (469) 510-9721

From: Assunto, Carmen <Assunto.Carmen@epa.gov>
Sent: Friday, September 3, 2021 3:57 PM
To: Patel, Anish <patel.anish@epa.gov>
Cc: HQ EOC Public Information Officer <HQ_PIO@epa.gov>; Loesel, Matthew <loesel.matthew@epa.gov>; Roff, Nicholas <Roff.Nicholas@epa.gov>
Subject: RE: Please Review - Hurricane Ida ASPECT Map for September 2

Thank you, this is approved. Carmen

From: Patel, Anish <patel.anish@epa.gov>
Sent: Friday, September 3, 2021 3:46 PM
To: Assunto, Carmen <Assunto.Carmen@epa.gov>
Cc: HQ EOC Public Information Officer <HQ_PIO@epa.gov>; Loesel, Matthew <loesel.matthew@epa.gov>; Roff, Nicholas <Roff.Nicholas@epa.gov>
Subject: Please Review - Hurricane Ida ASPECT Map for September 2

Carmen,

Please see the attached map for ASPECT flight conducted on September 2, 2021 for the Hurricane Ida response. Please review and approve to be posted on response website as **PUBLIC**.

Thanks in advance,

Anish Patel
Federal On Scene Coordinator (FOSC)
U.S. Environmental Protection Agency – Region 6
1201 Elm Street (SEDEC)
Dallas, TX 75270
Office: (214) 665-2288
Mobile: (469) 510-9721

Message

From: Patel, Anish [patel.anish@epa.gov]
Sent: 9/3/2021 9:36:43 PM
To: Assunto, Carmen [Assunto.Carmen@epa.gov]
CC: HQ EOC Public Information Officer [HQ_PIO@epa.gov]; Loesel, Matthew [loesel.matthew@epa.gov]; Roff, Nicholas [Roff.Nicholas@epa.gov]
Subject: RE: Please Review - Hurricane Ida ASPECT Map for September 2
Attachments: ASPECT MAP - Hurricane Ida_20210903_rev1.pdf

Ms. Carmen,

See attached for the revised map for approval.

Anish Patel
Federal On Scene Coordinator (FOSC)
U.S. Environmental Protection Agency – Region 6
1201 Elm Street (SEDEC)
Dallas, TX 75270
Office: (214) 665-2288
Mobile: (469) 510-9721

From: Assunto, Carmen <Assunto.Carmen@epa.gov>
Sent: Friday, September 3, 2021 3:57 PM
To: Patel, Anish <patel.anish@epa.gov>
Cc: HQ EOC Public Information Officer <HQ_PIO@epa.gov>; Loesel, Matthew <loesel.matthew@epa.gov>; Roff, Nicholas <Roff.Nicholas@epa.gov>
Subject: RE: Please Review - Hurricane Ida ASPECT Map for September 2

Thank you, this is approved. Carmen

From: Patel, Anish <patel.anish@epa.gov>
Sent: Friday, September 3, 2021 3:46 PM
To: Assunto, Carmen <Assunto.Carmen@epa.gov>
Cc: HQ EOC Public Information Officer <HQ_PIO@epa.gov>; Loesel, Matthew <loesel.matthew@epa.gov>; Roff, Nicholas <Roff.Nicholas@epa.gov>
Subject: Please Review - Hurricane Ida ASPECT Map for September 2

Carmen,

Please see the attached map for ASPECT flight conducted on September 2, 2021 for the Hurricane Ida response. Please review and approve to be posted on response website as **PUBLIC**.

Thanks in advance,
Anish Patel
Federal On Scene Coordinator (FOSC)
U.S. Environmental Protection Agency – Region 6
1201 Elm Street (SEDEC)
Dallas, TX 75270
Office: (214) 665-2288
Mobile: (469) 510-9721

Message

From: Taylor, Jillianne [Taylor.Jillianne@epa.gov]
Sent: 9/4/2021 1:35:55 PM
To: Loesel, Matthew [loesel.matthew@epa.gov]
Subject: RE: ASPECT Report for September 2, 2021

Thanks!

From: Loesel, Matthew <loesel.matthew@epa.gov>
Sent: Saturday, September 4, 2021 8:31 AM
To: Taylor, Jillianne <Taylor.Jillianne@epa.gov>
Subject: FW: ASPECT Report for September 2, 2021

Comments from third party reviewer.

From: I <subracom@aol.com>
Sent: Saturday, September 4, 2021 8:29 AM
To: Loesel, Matthew <loesel.matthew@epa.gov>; SubraCom@aol.com
Subject: Re: ASPECT Report for September 2, 2021

In the Background and Operations Overview section, the third paragraph begins After collecting 2 data sets over the Marathon Petroleum Company , the plane returned to the West side of the Shell Norco Facility and collected data.

Prior to that paragraph, there is no description of what occurred when initially monitoring the West side of the Shell Norco Facility.

Just for your information, Shell Chemical in Norco is located on the East and West sides. The petroleum refinery is located on the East side of Norco intermixed with the chemical plant.

Wilma

-----Original Message-----

From: Loesel, Matthew <loesel.matthew@epa.gov>
To: SubraCom@aol.com <SubraCom@aol.com>
Sent: Sat, Sep 4, 2021 7:52 am
Subject: ASPECT Report for September 2, 2021

Ms. Subra –

Please find attached a copy of the Draft Report from the ASPECT flight on September 2 in response to Hurricane Ida for review and comments. The report for yesterday should be available later today as well. Thank you for your attention to this.

Matthew Loesel
U.S. EPA – Federal On-Scene Coordinator
1201 Elm Street
Suite 500 (6SED-EC)
Dallas, Texas 75270
(214) 738 0674 (mobile)
(214) 665 8544 (office)
loesel.matthew@epa.gov

Message

From: Roff, Nicholas [Roff.Nicholas@epa.gov]
Sent: 9/4/2021 8:59:44 PM
To: Assunto, Carmen [Assunto.Carmen@epa.gov]
CC: HQ EOC Public Information Officer [HQ_PIO@epa.gov]; Loesel, Matthew [loesel.matthew@epa.gov]; Patel, Anish [patel.anish@epa.gov]
Subject: Please Review - Hurricane Ida ASPECT Map for September 3rd
Attachments: ASPECT MAP - Hurricane Ida_20210904_rev1.pdf

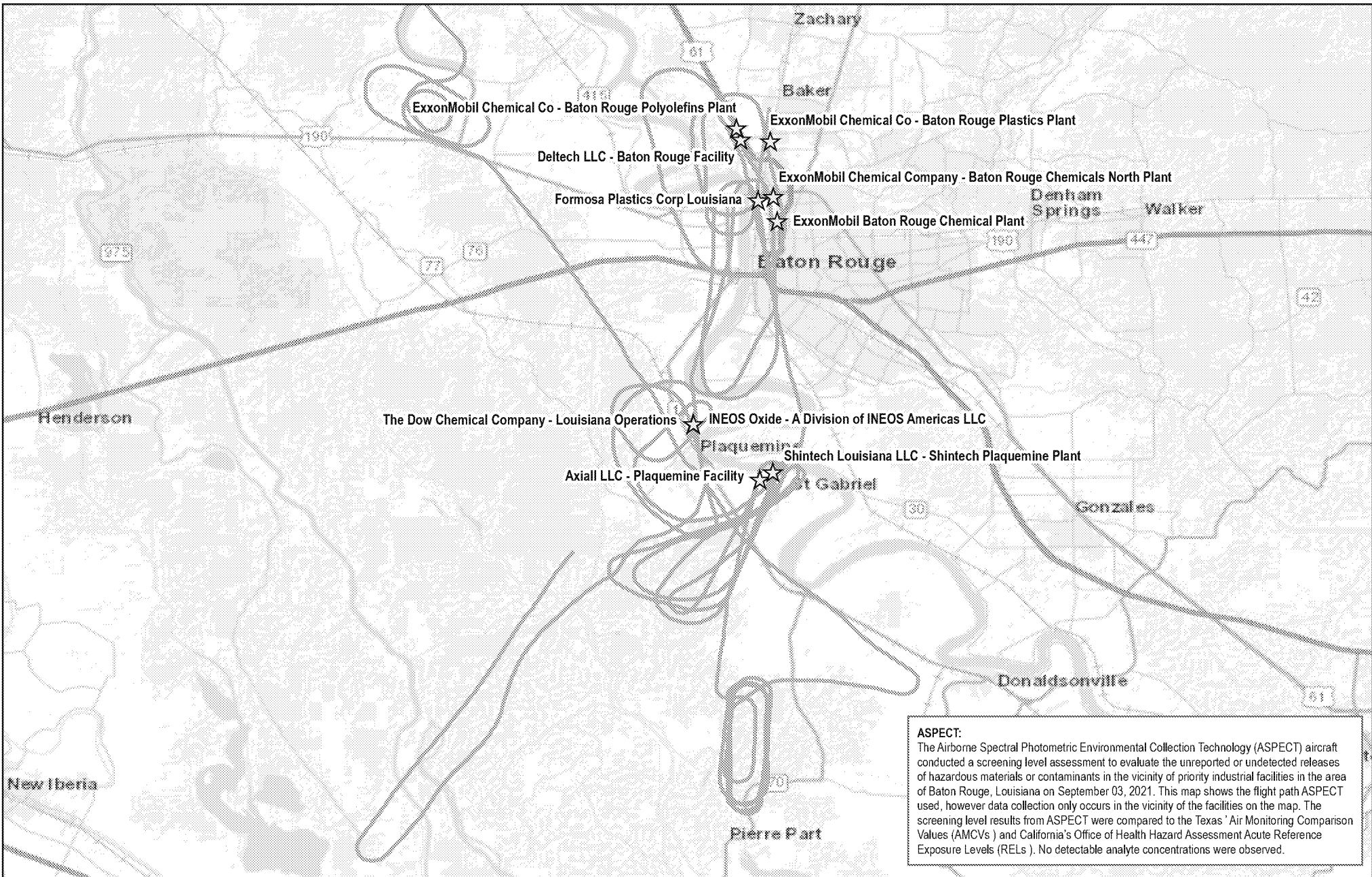
Carmen,

Please see attached pdf of the revised map for approval.

Thank you in advance,

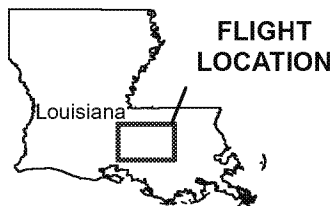


Nick Roff
Federal On-Scene Coordinator
U.S. Environmental Protection Agency – Region 6
1201 Elm Street Suite 500
Dallas, Texas 75270
(214) 665-3157 (office)
(469) 578-5172 (cell)
roff.nicholas@epa.gov



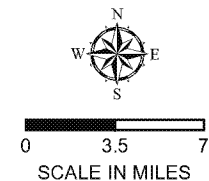
Legend

- ★ FACILITIES OF INTEREST
- ~ ASPECT FLIGHT PATH



ASPECT MAP HURRICANE IDA RESPONSE LOUISIANA

FLIGHT DATE
9/3/2021



**For Official Use Only
Printed via Web**



Printed: 3:47:17 PM 9/4/2021

Message

From: Taylor, Jillianne [Taylor.Jillianne@epa.gov]
Sent: 9/4/2021 7:20:49 PM
To: Loesel, Matthew [loesel.matthew@epa.gov]
Subject: RE: ASPECT Report for September 2, 2021
Attachments: ASPECT Summary - Hurricane Ida 2 September 2021 V2.docx

Hey Matt,

I've attached an updated copy of the report from Sept 02. Our report writing contractor is back! He added some more data to it, including an IRLS image and a table indicating that we did not have any chemical detections.

Thanks,
Jill

From: Loesel, Matthew <loesel.matthew@epa.gov>
Sent: Saturday, September 4, 2021 8:31 AM
To: Taylor, Jillianne <Taylor.Jillianne@epa.gov>
Subject: FW: ASPECT Report for September 2, 2021

Comments from third party reviewer.

From: I <subracom@aol.com>
Sent: Saturday, September 4, 2021 8:29 AM
To: Loesel, Matthew <loesel.matthew@epa.gov>; SubraCom@aol.com
Subject: Re: ASPECT Report for September 2, 2021

In the Background and Operations Overview section, the third paragraph begins After collecting 2 data sets over the Marathon Petroleum Company , the plane returned to the West side of the Shell Norco Facility and collected data.

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Wilma

-----Original Message-----

From: Loesel, Matthew <loesel.matthew@epa.gov>
To: SubraCom@aol.com <SubraCom@aol.com>
Sent: Sat, Sep 4, 2021 7:52 am
Subject: ASPECT Report for September 2, 2021

Ms. Subra –

Please find attached a copy of the Draft Report from the ASPECT flight on September 2 in response to Hurricane Ida for review and comments. The report for yesterday should be available later today as well. Thank you for your attention to this.

Matthew Loesel

U.S. EPA – Federal On-Scene Coordinator

1201 Elm Street

Suite 500 (6SED-EC)

Dallas, Texas 75270

(214) 738 0674 (mobile)

(214) 665 8544 (office)

loesel.matthew@epa.gov

Airborne Spectral Photometric Environmental Collection Technology

ASPECT Air Quality Survey for Hurricane Ida Baton Rouge, LA. September 02 2021



ASPECT Mission Supporting:

Eric Delgado
On-Scene Coordinator
Delgado.Eric@epa.gov

Initial Mission Request

Brian Fontenot
Louisiana Department of Environmental
Quality

ASPECT TEAM

Jill Taylor
Chemical/Photometric Lead
Taylor.Jillianne@EPA.gov
214-406-9896

Tony Honnellio
Radiological Lead (Detail)
Honnellio.Anthony@EPA.gov
617 947-4414

Ed Argenta
CBRN CMAD FOB Branch Chief
Argenta.Edward@EPA.gov
202-843-4511

Table of Contents

[TOC \o "1-3" \h \z \u]

Acronyms and Abbreviations

Alt	Altitude (in feet)
AGL	Above Ground Level
cm	centimeter
CST	Central Standard Time
DEM	Digital Elevation Model
Digital	Digital photography file from the Nikon D2X camera
ft	feet
FTIR	Fourier Transform Infrared Spectrometer
igm	Spectral data format based on grams format
IR	Infrared
IRLS	Infrared Line Scanner
jpg	JPEG image format
kts	knots
mph	miles per hour
m/s	meters per second
MSIC	Digital photography file from the Imperx mapping camera
MSL	Mean Sea Level Altitude (in feet)
ppm	parts per million
UTC	Universal Time Coordinated

Executive Summary

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 29 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2nd, the State of Louisiana requested ESF-10 assistance through FEMA and Region 6 asked for the ASPECT plane to be deployed in support of the response to Hurricane Ida. The state wanted assistance monitoring facility emissions in the industrial area between Baton Rouge and New Orleans, where flaring is resulting in the visible emission of black smoke.

ASPECT was tasked to perform remote chemical sensing over target properties to screen for airborne chemicals and take high-resolution photos to provide situational awareness. Potential areas identified for monitoring included: East Baton Rouge, Ascension, Iberville, St. James, St. John, St. Charles, Jefferson, and Orleans.

To support the Hurricane Ida response effort a total of 11 data collection runs (3 tests and 8 site passes) were made. Weather was conducive to successful data collection. Winds were light and predominantly from the West. Some scattered storms formed near Baton Rouge in the late afternoon that were routed around en route to the airport.

ASPECT Air Quality Survey

Hurricane IDA

Baton Rouge, LA

September 2, 2021

Background and Operational Overview

Hurricane Ida made landfall at 11:55 AM CDT Sunday, August 29 as a high-end category-4 hurricane, with maximum sustained winds of 150 mph. The storm moved ashore near Port Fourchon, Louisiana after a period of rapid intensification, tying for the fifth strongest landfalling continental US hurricane on record with Hurricane Laura of 2020, among three other hurricanes. Severe wind and large-scale flood damage have been reported to property and infrastructure in much of southeast Louisiana, including significant damage in New Orleans, Louisiana. In addition, Ida has caused widespread damage across the Mid-Atlantic and Northeast US.

On September 2, ASPECT was tasked to conduct a wide area air quality screening level assessment of areas populated with Risk Management Plan (RMP) sites and petrochemical facilities using the ASPECT system for detections of any airborne contaminants from ASPECT's 76 chemical detection library in the areas affected by Ida. The Region wanted to know if any detections were found, the location of the detection, and the concentration detected.

The first data collection was done over the Shell Norco East facility. After collecting two data sets over the Marathon Petroleum Company, the plane returned to the West side of the Shell Norco Facility and collected data there. No obvious activity was observed at either of the Shell Norco sites. Next, the plane headed to the Phillips 66 pipeline site. The ground crew provided two coordinates to the flight crew with instructions to fly from south to north between the two points. The first point started at the coordinate provided by Region 6, and the second point was chosen along a linear clearing which was presumed to be an indication of where the pipeline was buried. Just north of this site was one of the LDEQ priority sites, the Union Carbide Corp. Because it was so close, the flight crew was instructed to collect data there as well before flying to Baton Rouge to refuel and upload data. All sites surveyed are shown in Table 1.

There were no chemical detections at the sites surveyed. Extremely slow satellite transmission speeds (possibly due to high bandwidth use by other first responders) resulted in long delays in data collection. Some chemical photos were pulled down during flight, with the majority needing to be pulled down with a more high-speed internet connection on the ground. Unfortunately, when attempting to process the data on the

ground, the computer crashed multiple times, resulting in the decision to return to home base in Addison, TX to switch to a backup computer. The mission will resume on September 3. It should be noted that flight 1 was a system test mission and is not included in this report. Accordingly, all data collection begins with flight 2.

Table 1. Sites Covered on 02 September 2021 Flight

Facility	Lat	Lon
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.4097
Marathon Petroleum Company LP - Louisiana Refining Division - Garyville Refinery	30.061322	-90.5935
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.4224
PHILLIPS 66 PIPELINE LLC	29.923889	-90.4825
Union Carbide Corp - St. Charles Plant	29.982289	-90.4556

General Mission Objectives

Once granted access to fly over the sites, the following general mission objectives were employed in conducting data collection with ASPECT:

1. To capture an overall, situational awareness of the incident using aerial photography with:
 - Oblique camera—photos taken by hand from the view/position of the co-pilot, and
 - MSIC photos—advanced camera mounted underneath the plane for a top-down view of the designated sites.
2. To qualitatively locate and characterize any the visible and non-visible components of a plume, as well as any areas on fire:
 - Using the Infrared Line Scanner (IRLS)
3. To screen for the presence and location of specific chemicals within ASPECT's automated chemical detection library:
 - Using the Fourier Transform Infrared (FTIR) Spectrometer

Flight Conditions and Status

Weather and Site Conditions

Prior to each flight, an updated status of the current and forecasted weather, site conditions and any potential flight obstacles including radio towers impacting safety is assessed by the crew. A summary of the ground weather conditions during the missions can be found in Table 2.

**Table 2. Ground Weather for Baton Rouge, LA, Flight 2
2 September 2021**

Time	1153	1253	1353	1453	1550	1653
Wind direction	0 degrees	0 degrees	0 degrees	0 degrees	22.5 degrees NNE	315 degrees NW
Wind speed	1.3 m/s (3.0 mph)	3.1 m/s (7.0 mph)	1.3 m/s (3.0 mph)	2.2 m/s (5.0 mph)	4.0 m/s (9.0 mph)	3.1 m/s (7.0 mph)
Temperature	31.1 C	31.7 C	31.7 C	32.2 C	31.1 C	27.8 C
Relative humidity	63	63	63	64	71	70
Dew point	23.3 C	23.9 C	23.9 C	24.4 C	25.0 C	21.7 C
Pressure	1012.9 mb	1012.6 mb	1011.9 mb	1011.6 mb	1010.6 mb	1010.2 mb
Ceiling	Clear	Clear	Clear	Clear	Few 4100 Ft	Few 3800 Ft

Data Results

The following data is provided as a summary analysis. All data products are available for the Region to access on a shared FTP site. For a complete list of available products, see Appendix A. The data collected during these missions included a flight path summary, IRLS images, FTIR chemical identification and quantification, high resolution MSIC photos, and oblique photos.

Flight Paths

Wide, slow turns are required to be made in between runs to keep the instruments stable. The blue lines indicate the flight path while the green lines indicate the specific sections of the flight where chemical data was collected and processed. On Flight 2 the Baton Rouge area was surveyed, and the flight path is shown in Figure 1.

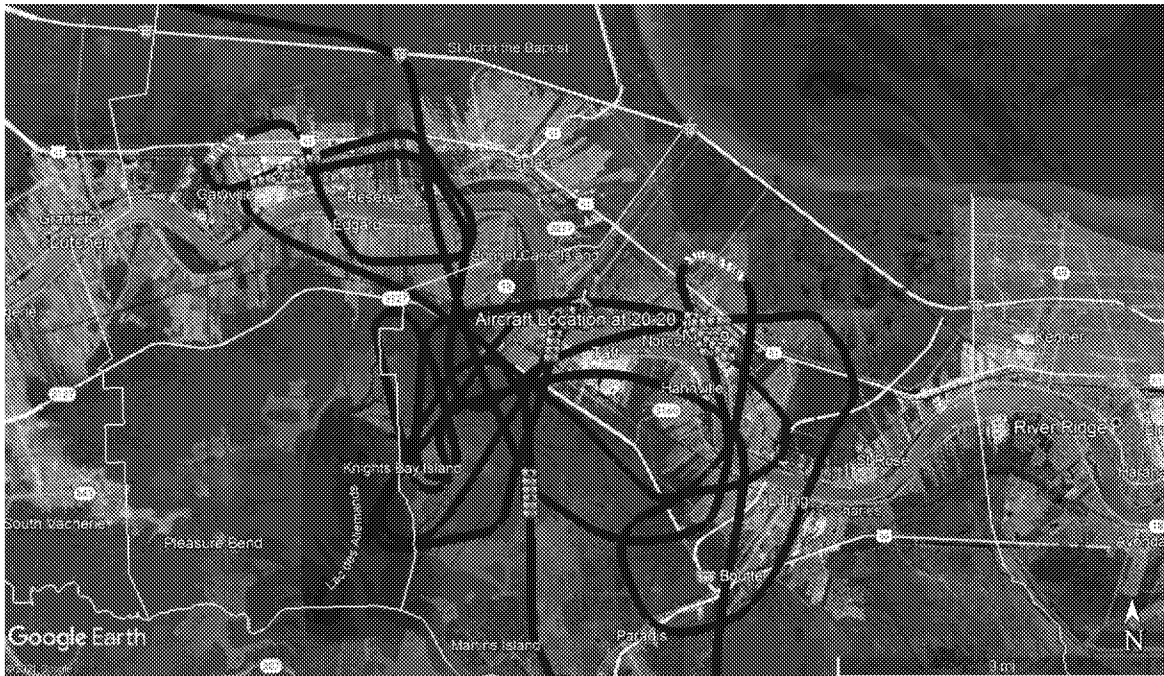


Figure 1. Data Collection Flight Path over the Baton Rouge Area Fight 2, September 2 2021

Line Scanner Data Results

A total of 11 data collection runs were made over the Baton Rouge area and during each collection run an infrared line scanner image was generated. Figure 2 shows a 3-band infrared image collected over a facility within the survey area. Examination of the image shows two small flares on the western side of the facility. Process piping throughout the facility shows ambient temperatures. No chemical plumes can be observed being emitted from the facility.

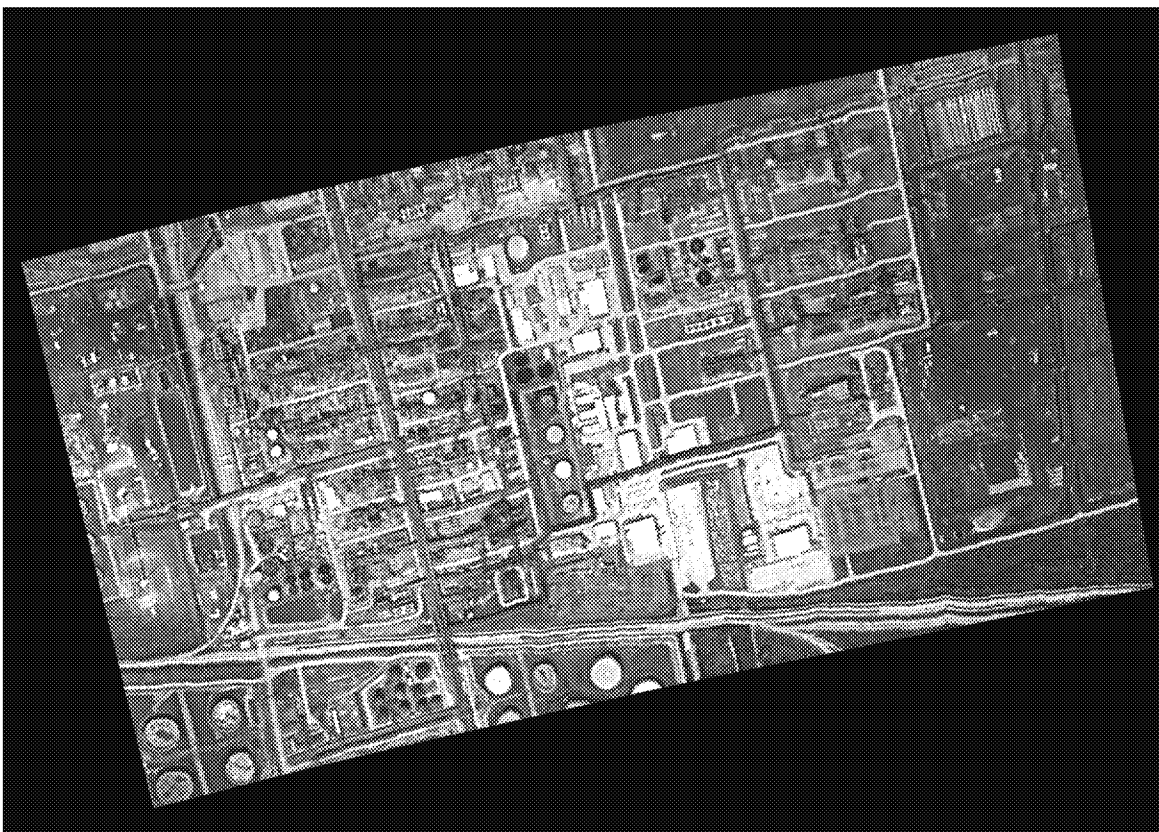


Figure 2. Three band IR image, Baton Rouge Area, Run 5, Flight 2, September 2 2021

FTIR Data Results

FTIR spectral data at a resolution of 16 wavenumbers was collected for each run. ASPECT uses an automated detection algorithm to permit compounds to be automatically analyzed while the aircraft is in flight. Seventy-six chemical compounds are included in the airborne algorithm library (the list is provided in Appendix C, Table 1). In addition, collected data was also manually quality checked against a collection of published library spectra for each chemical detected.

ASPECT did not detect any programmed compounds (those found in Appendix B, Table 1) as part of the mission over the Baton Rouge areas on September 2. Details of the monitoring results can be found in Table 2.

**Table 2. Chemical Results Summary
Baton Rouge Collection Area, Flight 2**

Pass	Date	Time (UTC)	Chemical	Max Concentration (ppm)
1	2021-09-02	17:21:59	ND	ND
2		17:46:10	ND	ND
3		18:05:06	ND	ND
4		18:57:35	ND	ND
5		19:10:35	ND	ND
6		19:19:22	ND	ND
7		19:28:16	ND	ND
8		19:38:51	ND	ND
9		20:02:54	ND	ND
10		20:11:35	ND	ND
11		20:20:00	ND	ND

Aerial Photography Results

A full set of high-resolution aerial digital photography were collected as part of each data collection pass. Weather conditions over the New Orleans area allowed high quality aerial images to be collected. Figures 3 and 4 show representative overhead and oblique images of the Marathon Petroleum Company imaged on Flight 2.

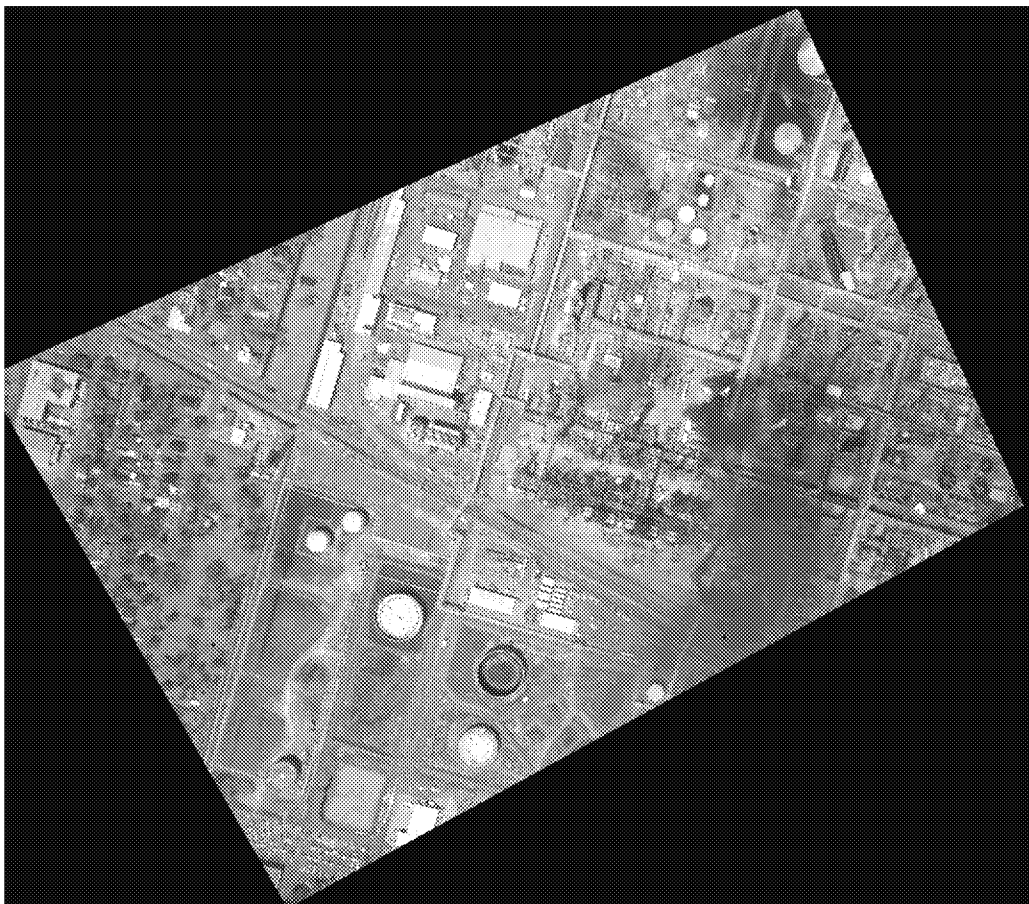


Figure 1. MSIC photo taken over the Marathon Petroleum Facility in Garyville, LA on September 2, 2021



Figure 2. Oblique photo taken over the Marathon Petroleum Facility in Garyville, LA on September 2, 2021

Conclusion

ASPECT conducted one flight mission on September 2 including air monitoring survey collections over the New Orleans area. Weather conditions were favorable for all types of data collection. Although two black plumes were visible over one of the sites, no major emissions were detected with the FTIR.

Appendix A: File Names of Data Collected During Flight
Baton Rouge Collection Areas, Flight 2, September 2, 2021

Run#	Time (UTC)	Altitude (MSL)	Velocity (knots)	MSIC Data Files	FTIR Data Files	IRLS Data Files	Gamma Files
1	17:21:59	5185	146	20210902172205321.jpg 20210902172212572.jpg 20210902172218935.jpg	20210902_172201_A.igm	2021_09_02_17_22_04_R_01 TA=28.9;TB=49.5;Gain=3	
2	17:46:10	5179	151	20210902174616618.jpg 20210902174622981.jpg 20210902174629329.jpg	20210902_174612_A.igm	2021_09_02_17_46_16_R_02 TA=24.8;TB=44.8;Gain=3	
3	18:05:06	5177	155	20210902180512152.jpg 20210902180519405.jpg 20210902180525768.jpg	20210902_180508_A.igm	2021_09_02_18_05_12_R_03 TA=12.5;TB=32.4;Gain=3	
4	18:57:35	2900	104	20210902185742116.jpg 20210902185748465.jpg 20210902185754814.jpg 20210902185801178.jpg 20210902185807527.jpg 20210902185813891.jpg	20210902_185738_A.igm	2021_09_02_18_57_41_R_04 TA=24.2;TB=44.2;Gain=3	
5	19:10:35	2960	106	20210902191041025.jpg 20210902191048278.jpg 20210902191054643.jpg 20210902191100991.jpg 20210902191107340.jpg	20210902_191038_A.igm	2021_09_02_19_10_41_R_05 TA=24.2;TB=44.4;Gain=3	
6	19:19:22	2968	107	20210902191928464.jpg 20210902191934828.jpg 20210902191942082.jpg 20210902191948446.jpg 20210902191954795.jpg 20210902192001143.jpg	20210902_191925_A.igm	2021_09_02_19_19_29_R_06 TA=29.1;TB=49.2;Gain=3	
7	19:28:16	2971	105	20210902192823176.jpg 20210902192829541.jpg 20210902192835889.jpg 20210902192842254.jpg 20210902192848602.jpg	20210902_192819_A.igm	2021_09_02_19_28_23_R_07 TA=31.4;TB=51.4;Gain=3	
8	19:38:51	2906	104	20210902193856857.jpg 20210902193904126.jpg 20210902193910475.jpg 20210902193916824.jpg 20210902193923188.jpg	20210902_193853_A.igm	2021_09_02_19_38_58_R_08 TA=30.2;TB=50.0;Gain=3	
9	20:02:54	2916	106	20210902200300337.jpg 20210902200306702.jpg 20210902200313051.jpg 20210902200319415.jpg 20210902200325764.jpg 20210902200333033.jpg	20210902_200257_A.igm	2021_09_02_20_03_01_R_09 TA=33.0;TB=52.8;Gain=3	
10	20:11:35	2921	106	20210902201141464.jpg 20210902201147813.jpg 20210902201154162.jpg 20210902201200527.jpg	20210902_201138_A.igm	2021_09_02_20_11_42_R_10 TA=31.4;TB=51.5;Gain=3	
11	20:20:00	2919	105	20210902202006230.jpg 20210902202013499.jpg 20210902202019848.jpg	20210902_202004_A.igm	2021_09_02_20_20_07_R_11 TA=24.3;TB=44.5;Gain=3	

**Appendix B: Priority Sites Provided by EPA Region 6 & Louisiana Department of
Environmental Quality**

Facility_Name	Latitude	Longitude	Parish
Deltech LLC - Baton Rouge Facility	30.552892	-91.200536	East Baton Rouge
ExxonMobil Chemical Co - Baton Rouge Plastics Plant	30.551419	-91.175611	East Baton Rouge
ExxonMobil Baton Rouge Chemical Plant	30.484336	-91.169644	East Baton Rouge
Marathon Petroleum Co LP	30.068394	-90.596364	St. John the Baptist
Westlake Vinyls Co LP	30.209167	-91.017222	Ascension
Valero Refining - Meraux LLC - Meraux Refinery	29.930222	-89.944917	St. Bernard
Cornerstone Chemical Company	29.964722	-90.264722	Jefferson
Chalmette Refining LLC	29.937903	-89.969903	St. Bernard
ExxonMobil Chemical Company - Baton Rouge Chemicals North Plant	30.50465	-91.173219	East Baton Rouge
Equilon Enterprises LLC - Norco Refinery	29.995372	-90.410167	St. Charles
The Dow Chemical Company - Louisiana Operations	30.313927	-91.240586	Iberville
Rubicon LLC - Geismar Facility	30.20139	-91.01222	Ascension
BASF Corp - Geismar Site	30.18425	-91.002778	Ascension
Union Carbide Corp - St. Charles Plant	29.982289	-90.455622	St. Charles
Phillips 66 Co - Alliance Refinery	29.68406	-89.98145	Plaquemines
Axiall LLC - Plaquemine Facility	30.267167	-91.184258	Iberville
ExxonMobil Fuels & Lubricants Co - Baton Rouge Refinery	30.484392	-91.169444	East Baton Rouge
Equilon Enterprises LLC dba Shell Oil Products US - Convent Refinery	30.107684	-90.890796	St. James
Marathon Petroleum Company LP - Louisiana Refining Division - Garyville Refinery	30.061322	-90.593528	St. John the Baptist
BASF Corp - Zachary Site	29.547603	-90.523231	East Baton Rouge
Occidental Chemical Corporation - Geismar Facility	30.18819	-90.98188	Ascension
St Rose Refinery LLC - St Rose Refinery	29.950875	-90.328497	St. Charles
ExxonMobil Chemical Co - Baton Rouge Polyolefins Plant	30.56215	-91.20387	East Baton Rouge
Shell Chemical LP - Norco Chemical Plant West Site	30.004925	-90.422381	St. Charles
NOVA Chemicals Olefins LLC - Geismar Ethylene Plant	30.230619	-91.052884	Ascension
Roehm America LLC - MMA Plant	29.9575	-90.265833	Jefferson
Valero Refining - New Orleans LLC - St Charles Refinery	29.985781	-90.3955	St. Charles
Shell Chemical LP - Norco Chemical Plant - East Site	29.995556	-90.409722	St. Charles
BASF Corp - North Geismar Site	30.20594	-90.99195	Ascension

Stolthaven New Orleans, LLC - Braithwaite Facility	29.870919	-89.949339	Plaquemines
Shintech Louisiana LLC - Shintech Plaquemine Plant	30.273611	-91.173333	Iberville
Denka Performance Elastomer LLC	30.053928	-90.524792	St. John the Baptist
Formosa Plastics Corp Louisiana	30.501722	-91.185944	East Baton Rouge
DuPont Specialty Products USA LLC - Pontchartrain Site	30.05388	-90.52472	St. John the Baptist
Occidental Chemical Corp - Taft Plant	29.987222	-90.454722	St. Charles
Syngenta Crop Protection LLC - St Gabriel Plant	30.246728	-91.103508	Iberville
Mosaic Fertilizer LLC - Faustina Plant	30.083914	-90.91345	St. James
Mosaic Fertilizer LLC - Uncle Sam Plant	30.037222	-90.8275	St. James
LBC Baton Rouge LLC - Sunshine Terminal	30.294444	-91.148333	Iberville
Occidental Chemical Corporation - Convent Facility	30.055885	-90.830594	St. James
TOTAL Petrochemicals & Refining USA Inc - Carville Polystyrene Plant	30.229786	-91.073631	Iberville
Targa Midstream Services LLC	29.237034	-89.384977	Plaquemines
EnLink LIG Liquids LLC - Plaquemine Gas Processing Plant	30.236389	-91.241389	Iberville
EnLink LIG Liquids LLC - Gibson Gas Processing Plant	29.643056	-90.961944	Terrebonne
NuStar Logistics LP - St James Terminal	30.030065	-90.843463	St. James
Enterprise Gas Processing LLC - Norco Fractionation Plant	30.015411	-90.402958	St. Charles
Lone Star NGL Refinery Services LLC - Geismar Fractionation Plant	30.218889	-91.035833	Ascension
INEOS Oxide - A Division of INEOS Americas LLC	30.313889	-91.240278	Iberville
Discovery Producer Services LLC - Discovery Paradis Fractionation Plant	29.858889	-90.453333	St. Charles
Plains Marketing LP - St James Terminal	30.004341	-90.848449	St. James
Methanex USA Services LLC - Geismar Methanol Plant	30.206667	-91.020833	Ascension
Dyno Nobel LA Ammonia LLC - Ammonia Production Facility	29.964789	-90.264625	Jefferson
Kinder Morgan Liquids Terminals LLC - Geismar Methanol Terminal	30.205389	-91.023792	Ascension
South LA Methanol LP - St James Methanol Plant	30.039917	-90.863819	St. James
YCI Methanol Plant	29.97481	-90.86775	St. James
IGP Methanol LLC - Gulf Coast Methanol Complex	29.625453	-89.926611	Plaquemines
KMe St James Holdings LLC - Methanol Terminal	29.990919	-90.841239	St. James
Kemira Chemicals Inc	29.964722	-90.264722	Jefferson
PHILLIPS 66 PIPELINE LLC	29.923889	-90.482498	St. Charles
CF INDUSTRIES	30.08328	-90.957665	Ascension

Appendix C: ASPECT Systems

The US EPA ASPECT system collects airborne infrared (IR) images and chemical screening data from a safe distance over the site (about 3,000 ft AGL). The system consists of an airborne high-speed Fourier Transform Infra-Red (FTIR) spectrometer coupled with a wide-area IR Line Scanner (IRLS). The ASPECT IR systems can detect chemical compounds in both the 8-to-12-micron (800 to 1200 cm^{-1}) and 3 to 5 micron (2000 to 3200 cm^{-1}) regions. List of chemicals and detection limits are listed in Table 1. The 8 to 12 micron region is typically known as the atmospheric window region since the band is reasonably void of water and carbon dioxide influence. Spectrally, this region is used to detect carbon - non-carbon bonded compounds. The 3 to 5 micron region is also free of water and carbon dioxide but typically does not have sufficient energy for use. This band does show use in high-energy environments such as fires. The carbon - hydrogen stretch is very common in this region.

An Imperx mapping camera (29 mega pixels; mapping focal plane array) is concurrently operated as part of all chemical collections. These images are often digitally processed in lower resolution, so they can be transmitted via satellite communication. All imagery is geo-rectified using both aircraft attitude correction (pitch, yaw, and roll) and GPS positional information. Imagery can be processed while in flight or approximately 600 frames per hour can be processed once the data are downloaded from the aircraft. The high-resolution images (>20 MB each) are pulled from the ASPECT after the sortie and are available later.

All aerial photographic images collected by the ASPECT system are ortho-rectified and geospatially validated by the scientific reach back team. In general, this consists of conducting geo-registration using a USGS Digital Elevation Model (DEM) which promotes superior pixel computation and lessens topographic distortion. The image is checked by the team (using a Google Earth base map) for proper location and rotation.

Airborne radiological measurements are conducted using three fully integrated multi-crystal sodium iodide (NaI) RSX4 gamma ray spectrometers. Each RSX4 spectrometer contains four 4"x2"x16" doped NaI crystals each having an independent photomultiplier/spectrometer assembly. One RSX unit is configured with an additional upward NaI crystal utilized to provide real-time cosmic ray correction. Count and energy data from each crystal and pack is combined using a self-calibrating signal processor to generate a virtual detector output. All radiological spectrometer "packs" are further combined using a signal console controlled by the on-board central computer in the aircraft. Altitude correction data is provided by a radar altimeter with internal GPS systems within the packs serving as a backup. It should be noted that no radiological measurements were conducted on this mission.

Data is processed using automated algorithms onboard the aircraft with preliminary results being sent using a satellite system to the ASPECT scientific reach back team for QA/QC analysis. Upon landing, preliminary data results are examined and validated by the

scientific reach back team.

Table 1. ASPECT Automated Compounds

This table contains ASPECT's library of automated compounds.

Detection limits are for each chemical is found in parenthesis in units of parts per million (ppm)

Acetic Acid (2.0)	Cumene (23.1)	Isoprene (6.5)	Phosphine (8.3)
Acetone (5.6)	Diborane (5.0)	Isopropanol (8.5)	Phosphorus Oxychloride (2.0)
Acrolein (8.8)	1,1-Dichloroethene (3.7)	Isopropyl Acetate (0.7)	Propyl Acetate (0.7)
Acrylonitrile (12.5)	Dichloromethane (6.0)	MAPP (3.7)	Propylene (3.7)
Acrylic Acid (3.3)	Dichlorodifluoromethane (0.7)	Methyl Acetate (1.0)	Propylene Oxide (6.8)
Allyl Alcohol (5.3)	1,1-Difluoroethane (0.8)	Methyl Acrylate (1.0)	Silicon Tetrafluoride (0.2)
Ammonia (2.0)	Difluoromethane (0.8)	Methyl Ethyl Ketone (7.5)	Sulfur Dioxide (15)
Arsine (18.7)	Ethanol (6.3)	Methanol (5.4)	Sulfur Hexafluoride (0.07)
Bis-Chloroethyl Ether (1.7)	Ethyl Acetate (0.8)	Methylbromide (60)	Sulfur Mustard (6.0)
Boron Tribromide (0.2)	Ethyl Acrylate (0.8)	Methylene Chloride (1.1)	Sulfuryl Fluoride (1.5)
Boron Trifluoride (5.6)	Ethyl Formate (1.0)	Methyl Methacrylate (3.0)	Tetrachloroethylene (10)
1,3-Butadiene (5.0)	Ethylene (5.0)	MTEB (3.8)	1,1,1-Trichloroethane (1.9)
1-Butene (12.0)	Formic Acid (5.0)	Naphthalene (3.8)	Trichloroethylene (2.7)
2-Butene (18.8)	Freon 134a (0.8)	n-Butyl Acetate (3.8)	Trichloromethane (0.7)
Carbon Tetrachloride (0.2)	GA (Tabun) (0.7)	n-Butyl Alcohol (7.9)	Triethylamine (6.2)
Carbonyl Fluoride (0.8)	GB (Sarin) (0.5)	Nitric Acid (5.0)	Triethylphosphate (0.3)
Carbon Tetrafluoride (0.1)	Germane (1.5)	Nitrogen Mustard (2.5)	Trimethylamine (9.3)
Chlorodifluoromethane (0.6)	Hexafluoroacetone (0.4)	Nitrogen Trifluoride (0.7)	Trimethyl Phosphite (0.4)
Chloromethane (12)	Isobutylene (15)	Phosgene (0.5)	Vinyl Acetate (0.6)

Message

From: Taylor, Jillianne [Taylor.Jillianne@epa.gov]
Sent: 9/4/2021 7:34:39 PM
To: Loesel, Matthew [loesel.matthew@epa.gov]
Subject: ASPECT Report for Sept 3
Attachments: ASPECT Summary - Hurricane Ida September 3 2021.docx

Hi Matt,

I've attached the draft report for yesterday (September 3rd). Should I send it to anyone else on the distribution list, or should I wait until it has been reviewed and 'finalized'?

Thanks,
Jill

Jill Taylor
Atmospheric Scientist, ASPECT
CBRN Consequence Management Advisory Division
Environmental Protection Agency
1201 Elm St., Dallas, TX 75270
Work Cell: 214-406-9896

Message

From: Loesel, Matthew [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F2136F67BD8644149EF4883722E4DA9A-LOESEL, MATT]
Sent: 9/5/2021 7:39:37 PM
To: SubraCom@aol.com
Subject: RE: ASPECT Report for September 4, 2021

Thank you for your time and effort!

From: I <subracom@aol.com>
Sent: Sunday, September 5, 2021 2:35 PM
To: Loesel, Matthew <loesel.matthew@epa.gov>
Subject: Re: ASPECT Report for September 4, 2021

September 4, 2021 ASPECT Report

Corrections:

Table 1. sites covered on September 3, 2021. Should be September 4, 2021.

Flight Paths

On Flight 5 the Baton Rouge area was surveyed, and the flight path is shown in Figures 1 and 2. Figure 1 shown flight path for Flight 5. Figure 2 shows flight path for Flight 6. Make correction on page above Flight 5 - Figure 1 and Flight 6 - Figure 2.

Line Scanner Data Results line 5 figure 3, capitalize Figure

Figure 3 Please add CF Industries to the title of the figure to represent the facility pictured.

Figure 4 Please add Occidental Chemical Facility to the title of the Figure to represent the facility pictured.

Paragraph above Table 4. two flights conducted on September 3, 2021 - The date should be September 4, 2021.

Aerial Photography Results section
The figure identified as Figure 3 should be Figure 5.

Figure 6, TBD facility - this does not match the name of a facility in Table 1.

Conclusions... covering 17 facilities. In the beginning of the report the text stated 19 facilities and the list of facilities presented in Table 1 consist of a list of 19 facilities. Please make it consistent.

Wilma

-----Original Message-----
From: Loesel, Matthew <loesel.matthew@epa.gov>
To: SubraCom@aol.com <SubraCom@aol.com>
Sent: Sun, Sep 5, 2021 12:57 pm
Subject: ASPECT Report for September 4, 2021

Ms. Subra –

Please find attached a copy of the Draft Report from the ASPECT flight on September 4 in response to Hurricane Ida for review and comments. The report for yesterday should be available later today as well. Thank you for your attention to this.

Matthew Loesel

U.S. EPA – Federal On-Scene Coordinator

1201 Elm Street

Suite 500 (6SED-EC)

Dallas, Texas 75270

(214) 738 0674 (mobile)

(214) 665 8544 (office)

loesel.matthew@epa.gov

Message

From: Loesel, Matthew [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F2136F67BD8644149EF4883722E4DA9A-LOESEL, MATT]
Sent: 9/7/2021 1:09:56 PM
To: Nicholas Roff (Roff.Nicholas@epa.gov) [Roff.Nicholas@epa.gov]; Shaikh, Taimur [Shaikh.Taimur@epa.gov]
Subject: FW: Requests for Air Monitoring from the Public

I will be setting up meeting to discuss the below with you and Eric Delgado and START

From: Delgado, Eric <Delgado.Eric@epa.gov>
Sent: Tuesday, September 7, 2021 8:09 AM
To: Loesel, Matthew <loesel.matthew@epa.gov>
Cc: Moore, Gary <Moore.Gary@epa.gov>; Crow, David <David.Crow@WestonSolutions.com>
Subject: Fwd: Requests for Air Monitoring from the Public

Matt,
Please set up a meeting with the EU and Data and me to discuss this upcoming mission.
Also invite David Crow.
David, please charge your time to the REOC Technical Support TDD for this meeting.

Sent from my iPhone

Begin forwarded message:

From: "Moore, Gary" <Moore.Gary@epa.gov>
Date: September 5, 2021 at 9:42:50 PM CDT
To: "Gray, David" <gray.david@epa.gov>
Cc: "Stenger, Wren" <stenger.wren@epa.gov>, "Carroll, Craig" <Carroll.Craig@epa.gov>, "Petersen, Chris" <petersen.chris@epa.gov>, "Nguyen, Lyndsey" <Nguyen.Lyndsey@epa.gov>, "Delgado, Eric" <Delgado.Eric@epa.gov>, "Adams, Adam" <Adams.Adam@epa.gov>, R6 RRC <R6_RRC@epa.gov>
Subject: FW: Requests for Air Monitoring from the Public

David, I sent the emails you received on to the LDEQ Incident Commander. See email below

From: Moore, Gary
Sent: Sunday, September 5, 2021 9:10 PM
To: R6 RRC <R6_RRC@epa.gov>
Subject: FW: Requests for Air Monitoring from the Public

From: Moore, Gary
Sent: Sunday, September 5, 2021 9:10 PM
To: Daniel Lambert <daniel.lambert@la.gov>
Subject: Requests for Air Monitoring from the Public

Daniel: See emails below from NGOs. You may want to get your media people involved and let them know what you guys are doing.

|||

From: Russel Honore' <russel.honore@gmail.com>

Date: September 5, 2021 at 8:10:05 PM CDT

To: Chuck Brown <Chuck.Brown@la.gov>, "Gray, David" <gray.david@epa.gov>, "Polk, Jonna" <Polk.Jonna@epa.gov>

Subject: Fwd: EPA monitoring or lack thereof

Mr Gray see notes below .I am sure Dr Brown will ask for air Monitoring help ASAP , reports show most of state air Monitoring is off line because I'd Ida .

----- Forwarded message -----

From: Darryl Malek-Wiley <darryl.malek-wiley@sierraclub.org>

Date: Sun, Sep 5, 2021 at 5:34 PM

Subject: EPA monitoring or lack thereof

To: Russel Honore' <russel.honore@gmail.com>, Jacques Morial <jacquesMorial@gmail.com>, Andy Jacoby <andrew@parishlawyer.com>, Rev Gregory Manning <gmanning1973@yahoo.com>, Larry Surapur <lesora77@yahoo.com>, Marylee Orr <marylee@leanweb.org>, Scott Eustis <scott@healthygulf.org>, Naomi Yoder Ex 213 <naomi@healthygulf.org>, Kimberly A Terrell <kterrell1@tulane.edu>, Van Dalen, Corinne J <cvandalen@earthjustice.org>, Cyndhia Ramatchandirane <cramatch@earthjustice.org>, Vickie Boothe <boothevickiel@gmail.com>, Robert Taylor <rtcnola@gmail.com>, Lisa Lavie Jordan <lwjordan@tulane.edu>, Monique Harden <moniqueh@dscej.org>, Dr. Beverly Wright <BeverlyLWright@gmail.com>

Dear All,

After reading EPA reports from Gloria Vaughn:

- 1) The SPECTOR plane has made some flights but data not yet on EPA web site.
- 2) EPA has checked all Superfund sites in Louisiana and no problems.
- 3) EPA has deployed some staff to monitor water pollution problems.
- 4) EPA has NOT deployed any staff to do Air monitoring and LADEQ's air monitoring is off line!!!
- 5) LADEQ has 17 plants on its high priority list so there should be air monitoring at all 17 sites.

LADEQ must ask EPA to deploy staff to do air monitoring during the restoration of operations at petrochemical plants in Cancer Alley.

Region 4 EPA is also ready to help EPA Region 6 if asked to deploy more staff to monitor air pollution.

Darryl

Best Regards, LT General Russel Honore (Ret) www.generalhonore.com (404) 227-1527 See/Smell Something, Say Something, Do Something. Take a picture Call 911

From: I <subracom@aol.com>

Date: September 5, 2021 at 7:07:03 PM CDT

To: "Gray, David" <gray.david@epa.gov>

Cc: "Arroyo, Victoria" <Arroyo.Victoria@epa.gov>, "Waterhouse, Carlton" <Waterhouse.Carlton@epa.gov>

Subject: Need for Summa Canister Sampling of Ambient Air on the Fence Lines of Industrial Facilities

Between Baton Rouge and New Orleans LA.

Reply-To: I <subracom@aol.com>

The ASPECT plane air monitoring of the Hurricane Ida's damage association with the industrial facilities between Baton Rouge and New Orleans and their venting, flaring and release of extensive smoke plumes, has not detected any of the 76 chemicals monitored for during September 2, 3 and 4, 2021 monitoring events.

LA DEQ is doing mobile monitoring in Norco and Chalmette. Hydrogen Sulfide and Sulphur Dioxide have been detected, as well as Methane and total hydrocarbons.

On behalf of the fence line community members living around the industrial facilities, there is a desperate need for collection of summa canister air samples along the fence lines of the industrial facilities during release events, flaring and smoke plume events, that move off the industrial facilities and into the communities. The summa canister air samples need to be analyzed for TO-15 Volatile Organic Compounds, Method 16 Sulphur Compounds and Tentatively Identified Compounds.

The ASPECT sampling and DEQ evaluations have identified flaring, smoke plumes and releases at a number of the industrial facilities, including the refineries and chemical plants in the Norco area, Marathon Refinery and Denka facility in Reserve, the Exxon Refinery and Chemical plants in the North Baton Rouge area, as well as additional facilities releasing toxic chemicals, flaring and releasing smoke/unburned toxic chemicals along the industrial corridor.

Is it possible to obtain resources necessary to fund canister grab air samples around the industrial facilities that are negatively impacting the health of the community members during the loss of electricity power by the industrial facilities and during the start up and shakedown periods that will be required to result in the industrial facilities return to compliance following the hurricane situation? These communities are located around and adjacent to the industrial facilities between Baton Rouge and New Orleans along the Mississippi River industrial corridor.

Thank you for considering this request.

Wilma Subra



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